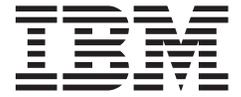6400 Line Matrix Printers

IBM

Setup Guide

Cabinet and Pedestal Models

IBM

6400 Line Matrix Printers

S544–5640–00

Setup Guide

Cabinet and Pedestal Models

> **Note!**
>
> Before using the information and the product it works with, ensure that you read the general information under "Notices" on page xi.

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3   Configuring the Printer

4 Configuration Menus

5 Printer Interfaces

6   Routine Service and Diagnostics

7   RibbonMinder

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A: Printer Specifications

B: A Quick Look at Line Matrix Printing

C: Host Attachment

D: Attaching Host Systems to a Coax/Twinax Printer

E: Code V, IGP, and IPDS Menus

Glossary

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Energy Star

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IBM Printing Systems Company participates in this program by introducing printers that reduce power consumption when they are not being used. As an ENERGY STAR® Partner, IBM Printing Systems Company has determined that this product meets the ENERGY STAR® guidelines for energy efficiency.

Note: The ENERGY STAR® emblem does not represent EPA endorsement of any product or service.

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Federal Communications Commission (FCC) Statement: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

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Canadian Department of Communications Compliance Statement: This Class A digital apparatus meets the requirements of the Canadian Interference-Causing Equipment Regulations.

Avis de conformité aux normes du ministère des Communications du Canada: Cet appareil numérique de la classe A respecte toutes les exigences du Réglement sur le matériel brouilleur du Canada.

The United Kingdom Telecommunications Statement of Compliance: This apparatus is approved under the approval No. NS/G/1234/J/100003 for the indirect connections to the public telecommunications systems in the United Kingdom.

New Zealand: Warning – This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Japanese VCCI:

注意
　この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準
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害を引き起こすことがあります．この場合には使用者が適切な対策を講ずる
よう要求されることがあります．

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Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse A. Für diese Klasse von Geräten gilt folgende Bestimmung nach dem EMVG:

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(Auszug aus dem EMVG vom 9.Nov.92, Para.3, Abs.4)

Hinweis: Dieses Genehmigungsverfahren ist von der Deutschen Bundespost noch nicht veröffentlict worden.

Electrical Safety

This printer is inspected and listed by recognized national testing laboratories, such as Underwriters Laboratories, Inc. (UL) in the U.S.A. and Canadian Standards Association (CSA) in Canada. Listing of a product by a national testing laboratory indicates that the product is designed and manufactured in accordance with national requirements intended to minimize safety hazards. IBM equipment meets a very high standard of safety in design and manufacture. Remember, however, that this product operates under conditions of high electrical potentials and heat generation, both of which are functionally necessary.

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> OS/2
> OS/400
> Print Services Facility PSF
> Proprinter
> VTAM

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DEC	Digital Equipment Corporation
Dataproducts	Dataproducts, Inc.
ENERGY STAR®	United States Environmental Protection Agency
Epson	Epson Seiko Corporation
Ethernet	Xerox Corporation
FX	Epson Seiko Corporation
IGP	Printronix, Inc.
MS-DOS	Microsoft Corporation
Netware	Novell, Inc.
Novell	Novell, Inc.
Printronix	Printronix, Inc.
QMS	Quality Micro Systems, Inc.
RibbonMinder	Printronix, Inc.
Windows	Microsoft Corporation

Safety Notices

 DANGER:

<1> Before powering on the printer ensure the printer is plugged into an appropriate power source. Refer to Chapter 2 of the Setup Guide for information on the proper source.

<2> Switch off the printer power and unplug the printer power cord before cleaning the printer.

<4> Do not connect or disconnect any communication port, teleport, attachment connector, or power cord during an electrical storm.

<5> Power off the print and disconnect the power cord before connecting or disconnecting communication port, teleport, or attachment cable connector.

1 **Introduction**

Chapter Contents

About This Setup Guide

This *Setup Guide* is designed so that you can quickly install and configure your IBM 6400 printer.

How to Locate Information

You can locate information in four ways:

- Use the **Table of Contents** at the front of the manual.
- Use the **Chapter Contents** listed at the front of each chapter.
- Use the **Index** at the back of the manual.
- Use the **Glossary** to understand the printer terms and acronyms in this *Setup Guide*.

Notes and Notices

For your safety and to protect valuable equipment, it is very important that you read and comply with the notes and notices included in this manual. Danger and Caution notices are numbered. These numbers enable you to find translated versions of these notices in the IBM 6400 Line Matrix Printer Safety Notices booklet. Descriptions for each type of notice follow:

DANGER:

<#> The word Danger indicates the presence of a hazard that has the potential of causing death or serious personal injury.

CAUTION:

<#> The word Caution indicates the presence of a hazard that has the potential of causing moderate or minor personal injury.

CAUTION:

<#> This symbol indicates an assembly that requires two or more persons to lift or hold.

ATTENTION

An attention notice indicates the possibility of damage to a program, device, system, or data.

IMPORTANT

Important draws your attention to information vital to proper operation of the printer.

NOTE: A note gives you helpful tips about printer operation.

Format Conventions

Key names, indicator names, and messages that appear on the operator panel display are capitalized as they actually appear on the printer. Key names are shown in bold. For example:

Press the **Start** key. The Attention indicator will light.

Related Documents

For more information about your printer, refer to the following documents:

- *IBM 6400 Line Matrix Printer Operator's Guide* (S544–5641) — Includes step-by-step instructions on daily printer operations.

- *IBM 6400 Line Matrix Printer Safety Notices* (G544–5389) — Provides translated safety notices.

- *IBM 6400 Line Matrix Printer Maintenance Information Manual* (S246–0117) — Explains how to maintain and repair the 6400 line matrix printer at the field service level of maintenance. This manual covers alignments and adjustments, preventive and corrective maintenance, troubleshooting, and basic principles of operation.

- *IBM 6400 ASCII Programmer's Reference Manual* (S544–5635) — Provides descriptions of ASCII printer codes and character sets.

- *IBM 6400 Coax/Twinax Programmer's Reference Manual* (S544–5636) — Provides descriptions of coax and twinax printer control codes and character sets.

- *IBM 6400 IPDS Programmer's Reference Manual* (S544–5637) — Provides information used with the IPDS* emulation enhancement feature.

- *Coax/Twinax Multi-Platform Interface Feature Operation Guide* (S544–5642) — Describes how to install and use this feature to support coax/twinax attachment to host systems.

- *IBM 6400 Code V User's Manual* (S544–5638) — Provides information used with the optional Code V** Printronix** emulation enhancement feature. The Code V Printronix emulation allows you to create and store forms; generate logos, bar codes, and expanded characters; create other graphics, and merge graphics with alphanumeric data as a document is printed. This emulation is based on the Quality Micro Systems, Inc., graphics language.

- *IBM 6400 IGP** User's Manual* (S544–5639) — Provides information used with the optional IGP Printronix emulation enhancement feature. The IGP Printronix emulation allows you to create and store forms; generate logos, bar codes, and expanded characters; create other graphics, and merge graphics with alphanumeric data as a document is printed.

- *Ethernet Interface User's Manual* (S246–0153) – Provides information used to configure the Ethernet interface in all system configurations. Specifics are given to assist in the configuration using command lines or the web browser interface.

The IBM 6400 Printer

The IBM 6400 printers offer software versatility and the latest refinements in line matrix printing technology.

Most line printers have specialized architectures that enable them to emulate, or behave like another printer. Your IBM printer, however, introduces an open architecture in which numerous emulations may be selected from the operator panel.

Proprinter* III XL, Epson** FX, P-Series, P-Series XQ, and Serial Matrix are the standard emulations. Coax and Twinax are offered as interface features. IPDS, Code V, and IGP are offered as optional emulation features. To load all of the configuration parameters (forms length, line spacing, etc.), simply power on the printer.

You can easily switch to any of the optional emulations by using the recall custom set feature from the operator panel. You can also switch emulations by using the operator panel keys.

No matter what emulation is installed, your printer is very easy to use. The message display and lights on the operator panel communicate with you clearly and directly. You can select every function on your printer at the operator panel or you can send commands from the host computer.

Cabinet Models
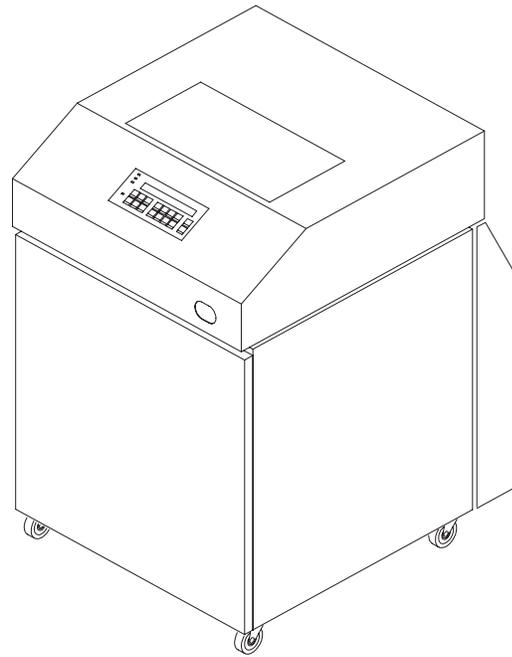
Cabinet Models with
Power Paper Stacker
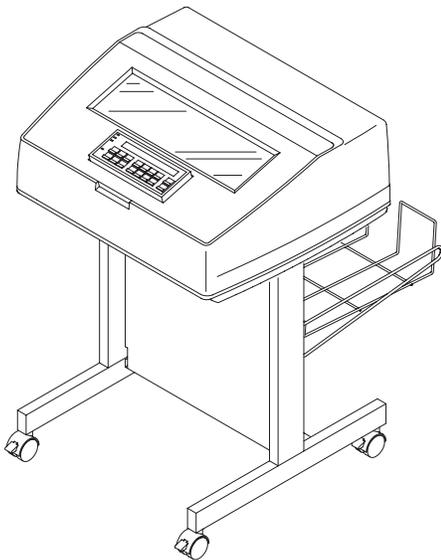
Pedestal Models

Figure 1–1. The IBM 6400 Line Matrix Printer

Standard Capabilities

The 6400 has the following general characteristics:

- A broad range of print speeds in both cabinet and pedestal models
- Supports similar features across the entire product line to allow maximum flexibility in matching the printer to the requirements
- ENERGY STAR** compliant

The following sections summarize the standard capabilities of the IBM 6400 printer.

Host Computer Interfaces

The following host computer interface choices are available:

- RS–232 Serial
- RS–422 Serial
- PC Parallel
- Dataproducts Parallel
- Ethernet** Interface
- IEEE 1284

Two Coax/Twinax features are available with this printer:

- IBM Coax/Twinax
- Coax/Twinax Multi-Platform Interface

These are described in Optional Features, on page 1–10.

Printer Emulations

Each emulation provides a different set of configuration menus, control codes, and character sets. The following printer emulations (or protocols) are standard, and selectable at the operator panel:

- Proprinter III XL Emulation
- Epson FX Emulation
- Printronix P-Series Printer Emulation
- Printronix P-Series XQ Variant Printer Emulation
- Printronix Serial Matrix Printer Emulation

Proprinter III XL and Epson FX Emulations

The Proprinter III XL and Epson FX emulations are industry-standard printer emulations.

Printronix P-Series Printer Emulation

This code system was developed especially for Printronix line matrix printers. As line matrix printers became more sophisticated, this code system kept pace by adding codes that fully exploit line matrix printer capabilities.

IMPORTANT

This emulation appears as "P-Series" on the operator panel.

Printronix P-Series XQ Variant Printer Emulation

This code system was devised for a series of Printronix printers manufactured between 1974 and 1991, that are no longer available. It enables the printer to emulate Printronix P300 and P600 printers.

IMPORTANT

This emulation appears as "P-Series XQ" on the operator panel.

Printronix Serial Matrix Printer Emulation

This printer emulation is very similar to the code systems used by an IBM Graphics Printer, but incorporates several systems into one emulation. This emulation enables a line matrix printer to print files coded for a serial matrix printer, and is sometimes referred to as the Serial Matrix emulation.

IMPORTANT

This emulation appears as "Serial Matrix" on the operator panel.

NOTE: *Serial matrix* refers to the way printer characters are formed: A moving printhead uses pins to form whole characters one at a time and one after the other. The pins print dots according to programmed matrix patterns. Data is sent to the printer through either a serial or a parallel interface, but the *printhead* must receive the data serially in order to form each character.

An IBM line matrix printer also forms characters with dots in matrix patterns, but it feeds print data in parallel to many hammers mounted on a rapidly oscillating shuttle. The hammers fire simultaneously to print entire lines at a time.

Output Control

The printers have the following output control features:

- Six modes for printing text:

    1) Near-Letter Quality (NLQ)
    2) Near-Letter Quality Sans Serif
    3) Data Processing (DP)
    4) Draft
    5) Optical Character Recognition Font A (OCR A)
    6) Optical Character Recognition Font B (OCR B)

    OCR A and OCR B support 120 and 180 PEL, with 120 PEL the default value.

- Selectable forms length and width

- Character attribute specification:

    1) Selectable pitch: normal, expanded, and compressed
    2) Emphasized (shadow) printing
    3) Automatic underlining and overscoring
    4) Superscript and subscript printing
    5) Double high and wide printing

- Resident multinational character sets

Graphics and Vertical Formatting

Several graphics and vertical formatting features are available:

- Three built-in graphics generators:

    1) IBM Proprinter III XL bit-image graphics
    2) Epson FX dot graphics mode
    3) Printronix P-Series Plot

- Programmable electronic vertical formatting provides rapid vertical paper movement to specified lines for printing repetitive and continuous forms. You can use the following methods:

    1) Vertical tabbing in Serial Matrix, Proprinter III XL, and Epson FX emulation modes
    2) Electronic Vertical Format Unit (EVFU) in P-Series emulation mode

Built-in Diagnostic Tools

The following diagnostic tools are provided with the printer:

- Comprehensive diagnostic self-tests permanently stored in the printer
- Configuration printout
- Data stream hex code printout

Optional Features

The following features can be ordered and installed on this printer. If you ordered a feature at the time of purchase, the feature may already be installed on your printer. Refer to the documentation shipped with the feature for more details.

For detailed information about these features or for information on ordering a feature, contact your IBM sales representative or IBM Authorized Remarketeer.

- IBM Coax/Twinax Attachment:

  Enables you to attach this printer to IBM host systems, such as an AS/400 or S/390. This feature also helps you to replace IBM coax/twinax printers such as the IBM 3262 Models 3 and 13, IBM 4234 Models 1, 2, and 9, and IBM 5224 Models 1 and 2. This feature can be used with the Intelligent Printer Data Stream (IPDS) feature which is described below.

- Coax/Twinax Multi-Platform Interface (MPI) Feature:

  Enables you to replace many non-IBM printers that are coax or twinax-compatibly attached to various IBM systems. This feature also enables you to attach this printer using both the parallel and coax/twinax ports. Then, you can submit print jobs using parallel and either coax or twinax communication protocols.

- IBM Intelligent Printer Data Stream Coax/Twinax:

  Provides the ability to create forms, overlays, and graphics. IPDS also provides compatibility when replacing printers such as the IBM 4234 Models 7 and 11. This feature also supports many versions of the Print Services Facility* (PSF*). This feature requires the IBM Coax/Twinax Attachment.

- Code V:

  This is an implementation of the Printronix Intelligent Graphics Processor architecture and is used commonly to create graphics for optical character recognition and bar codes. This feature is also designed for those applications which use the Quality Micro Systems, Inc. graphics language, which is often referred to as the QMS Code V Magnum emulation and those applications that use the Printronix Code V Graphics Language. The Printronix Code V Graphics Language is often referred to as VGL.

  This feature can co-exist with the IBM Intelligent Printer Data Stream feature, and/or with either coax/twinax feature, or can be used on the ASCII models.

- IGP:

  This is an implementation of Intelligent Graphics Processor architecture and is used commonly to create graphics for optical character recognition and bar codes. This feature is also designed for those applications which use the Printronix Graphics Language, which is often referred to as PGL.

  This feature can co-exist with the IBM Intelligent Printer Data Stream feature, and/or with either coax/twinax feature, or can be used on the ASCII models.

- Network Print Server:

  Enables you to attach your printer to Local Area Networks using token-ring or Ethernet protocols. The Network Print Server functions as a workstation server on your network, enabling your users to submit print jobs to your printer.

  The Network Print Server provides multiple network protocol support that allows you to submit print jobs from Novell** Netware**, IBM LAN Server, IBM AIX*, and other TCP/IP networks.

- Dataproducts Adapter:

  Supplies a 50 pin AMP Amplimite HDH-20 data cable connector. This feature is necessary if you are using the Dataproducts parallel protocol.

- Ethernet Interface:

  Enables you to attach your printer to Local Area Networks using Ethernet protocols. The Ethernet Interface functions as a workstation server on your network, enabling your users to submit print jobs to your printer.

- Power Paper Stacker:

  Mechanically directs the paper from the printer to the paper stacking area. This feature provides consistent paper handling with fewer paper jam errors.

- Input Paper Shelf:

  Pedestal model only. Provides a shelf to hold a box of paper or forms. This is a convenient feature if you need to move the printer often.

Protocols and Emulations

A *protocol* is a set of rules governing the exchange of information between the printer and its host computer. These rules consist of codes that manipulate and print data and allow for machine-to-machine communication. A printer and its host computer must use the same protocol. As used in this manual, *protocol* and *emulation* mean the same thing.

Most impact printers use single ASCII character codes to print text, numbers, and punctuation marks. Some characters, both singularly and in groups are defined as control codes. Control codes instruct the printer to perform specific functions, such as underlining text, printing subscripts, setting page margins, etc. The main difference between most printer protocols is in the characters used to create control codes and the ways in which these characters are formatted.

When the printer executes the character and control codes of a particular printer protocol, it is "emulating" that printer. If the printer uses the Proprinter III XL protocol, for example, it is emulating an IBM Proprinter III XL printer. If the printer is using the Epson FX printer protocol, for example, we can also say it is in Epson FX emulation mode.

There are additional emulations that are provided as optional features, such as the IGP and Code V emulations. For additional information, refer to Appendix D and the related documents listed in the section that begins on page 1–3.

2 Setting Up the Printer

Chapter Contents

Installation, Attachment, and Configuration Overview

DANGER:

<4>	**Do not connect or disconnect any communication port, teleport, attachment connector, or power cord during an electrical storm.**
<5>	**Power off the print and disconnect the power cord before connecting or disconnecting communication port, teleport, or attachment cable connector.**

The following is an overview of the steps you need to complete to successfully install, attach, and configure your printer:

1. Unpack the printer from the shipping package. Follow the instructions provided on the shipping package.

2. Set up the printer, which includes; removing shipping materials, installing a ribbon, and loading paper. Follow the instructions in Chapter 2, "Setting Up the Printer."

3. Perform an initial print test by printing the current configuration page as described in Chapter 3, "Configuring the Printer."

4. Review the information contained in the *README.1ST* file on the Configuration Utility diskette.

NOTE: The Configuration Utility diskette contains a *README.1ST* file that describes the contents of the diskette, AIX print drivers, and configuration information for replacing existing Printronix printers. In addition, there might be another file, called *README.TXT* that contains information that was added after the printer documentation was printed.

5. Attach the printer to the host system and configure the host system to work with the printer.

   a. For ASCII attachments, follow the instructions in the *6400 ASCII Programmer's Reference Manual.*

b. For Coax/Twinax attachments, follow the instructions in either the *6400 Coax/Twinax Programmer's Reference Manual* or the *Coax/Twinax Multi–Platform Interface Option Installation and Operation Guide.*

c. If you have ordered the Network Print Server feature, follow the instructions in either the *Network Print Server Ethernet Administrator's Guide,* or the *Network Print Server Token–Ring Administrator's Guide.*

d. If you have ordered the Ethernet Interface, follow the instructions in the *Ethernet Interface User's Manual.*

NOTE: If you are attaching this printer to an AIX host system, use the AIX Version 3.2.5 and 4.1 print drivers provided on the Configuration Utility diskette.

6. If you have not already ordered a communications cable, see page A–9.

7. Configure the printer to work with host systems and to match your emulation, such as IBM Proprinter III XL. Follow the instructions provided in Chapter 3, "Configuring the Printer," and review the information provided in Appendix C, "Host Attachment."

NOTE: If you are replacing a Printronix printer, such as a P300, with this printer, make sure you review the information on the Configuration Utility diskette. The Configuration Utility diskette contains information that will help you configure this printer to match the configuration of the printer you are replacing.

8. Install and/or configure optional features by following instructions provided in the appropriate feature manual. Also, review Appendix E, "Code V, IGP, and IPDS Menus" for a brief description of the configuration information for the Code V, IGP, and IPDS optional features.

NOTE: For more detailed information about any optional feature, refer to the manual that was shipped with the feature. If you want to order a manual to learn more about these features, see the "Related Documents" section that begins on page 1–3.

Before You Begin

Read this chapter carefully before installing and operating the IBM 6400 printer.

The printer is easy to install, but for your safety and to protect valuable equipment, perform all the procedures in this chapter in the order presented.

IMPORTANT

Make sure you have a way to move the printer and shipping pallet. You will need a pallet jack.

Make sure you have adequate room to maneuver the shipping pallet and printer to the location where you plan to install the printer.

CAUTION:

<1> **Two people are required to unload the printer from the shipping pallet. The shipping weight of the cabinet mode3l is 129.3 kilograms (285 pounds) or 139 kilograms (306) pounds if the Power Paper Stacker is installed. The shipping weight of the pedestal model printer is 72.6 kilograms (160 pounds).**

Select a Site

Select a printer site that meets the following requirements:

- Cabinet models: Permits complete opening of the printer cover and both doors of the floor cabinet. See dimension requirements in Figure 2–1 on page 2–7.

- Pedestal models: Permits complete opening of the printer cover and good access to the paper areas at the front and rear of the printer. See dimension requirements on page 2–7. In addition, the location for the pedestal models must be able to handle the acoustics level of the printer.

- Has a power outlet that supplies 100 to 120 Volts AC or 200 to 240 Volts AC at 47 to 63 Hz. The printer automatically senses and adjusts itself to conform to the correct voltage range. For more information, see the input voltage characteristics in Appendix A, "Printer Specifications."

- Is relatively dust-free.

- Has a temperature range of 10° C to 40° C (50° F to 104° F), and a relative humidity from 10% to 90% (noncondensing).

- Is located within the maximum allowable distance to the host computer. This distance depends on the type of interface you plan to use, as shown in the following table:

Type of Interface	Maximum Distance to Host	
PC Parallel (See Note below)	5 meters	(15 feet)
IEEE 1284 Parallel (See Note below)	5 meters	(15 feet)
Dataproducts	12 meters	(40 feet)
Serial RS–232	15 meters	(50 feet)
Serial RS–422	1220 meters	(4000 feet)
Twinax (shielded cable)	1500 meters	(4920 feet)
Twisted Pair / Type 3	300 meters	(985 feet)
Coax	1500 meters	(4920 feet)
Ethernet 10Base–T	100 meters	(328 feet)
Ethernet 10Base–2	185 meters	(607 feet)

NOTE: For more reliable data transfers, a maximum of six feet is recommended for parallel cable length.
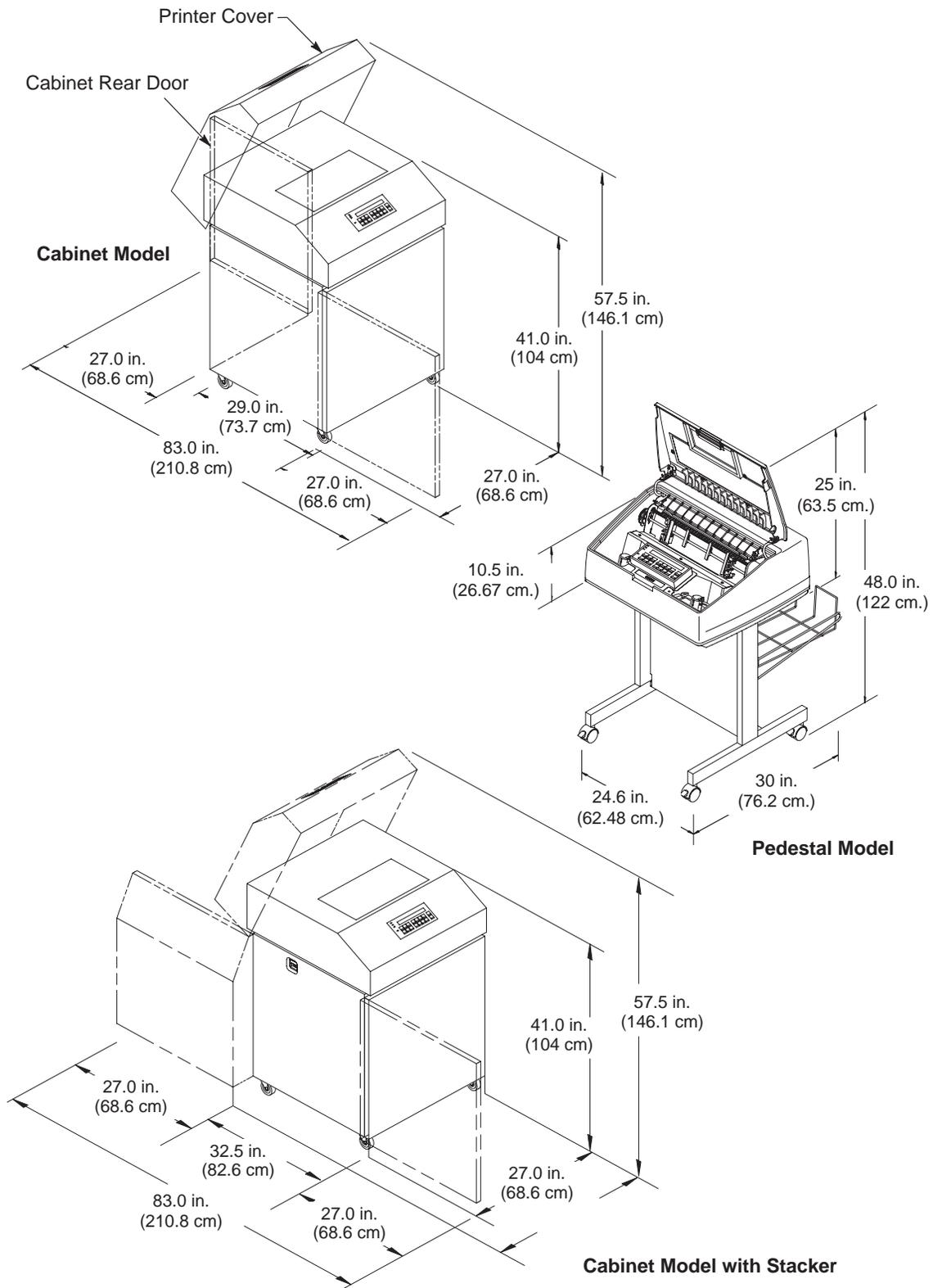
Figure 2–1. Printer Dimensions

Printer Component Locations

Familiarize yourself with the names and locations of the printer components shown in the following figures *before* continuing with the rest of the installation procedure.
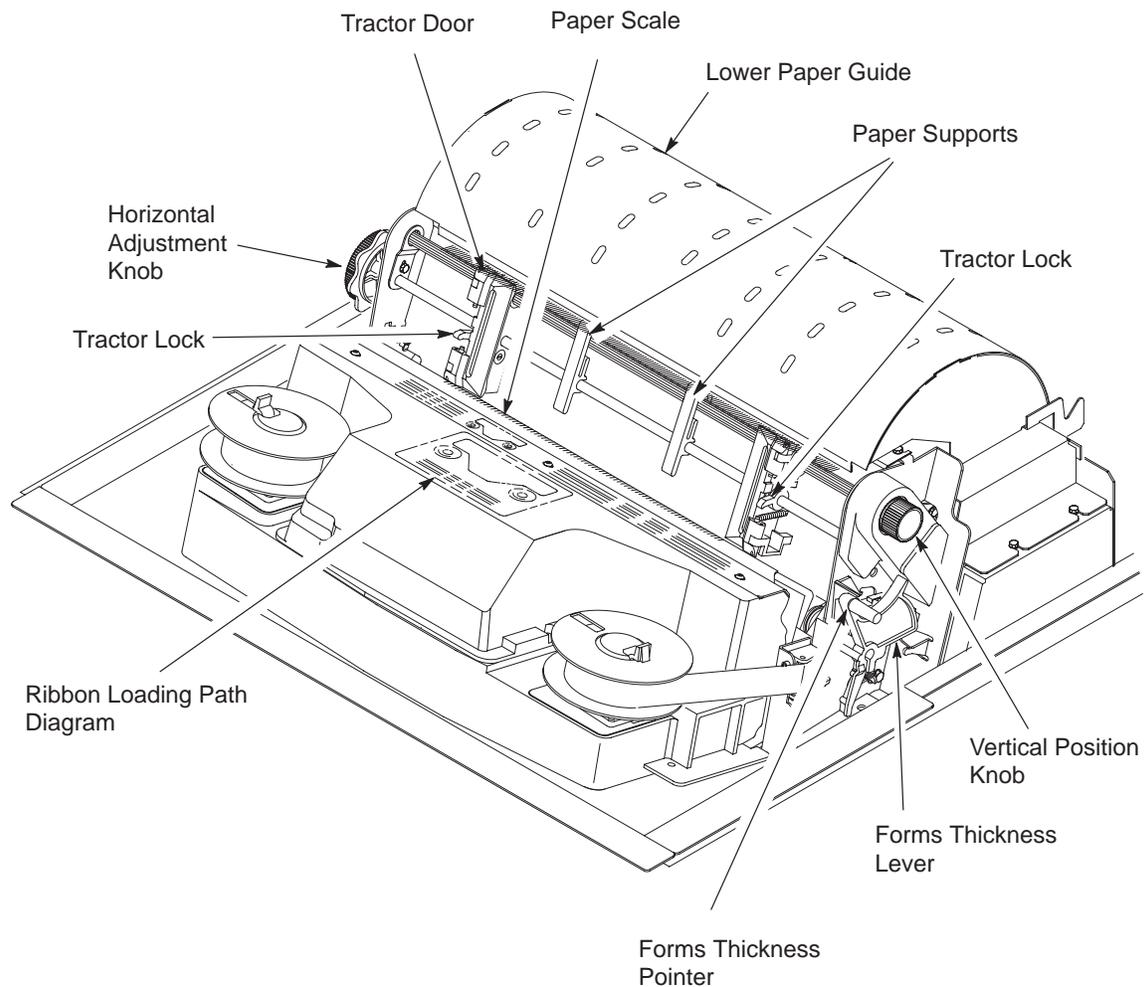
Figure 2–2. Cabinet Model Component Locations

Ribbon Spool

Tractor

Splined Shaft

Tractor

Hub Latch

Platen

Ribbon Hub

Base Casting

Shuttle Cover Assembly

Forms Thickness Lever

Ribbon Guide (2)

Hammer Bank (beneath shuttle cover assembly)

Ribbon Mask
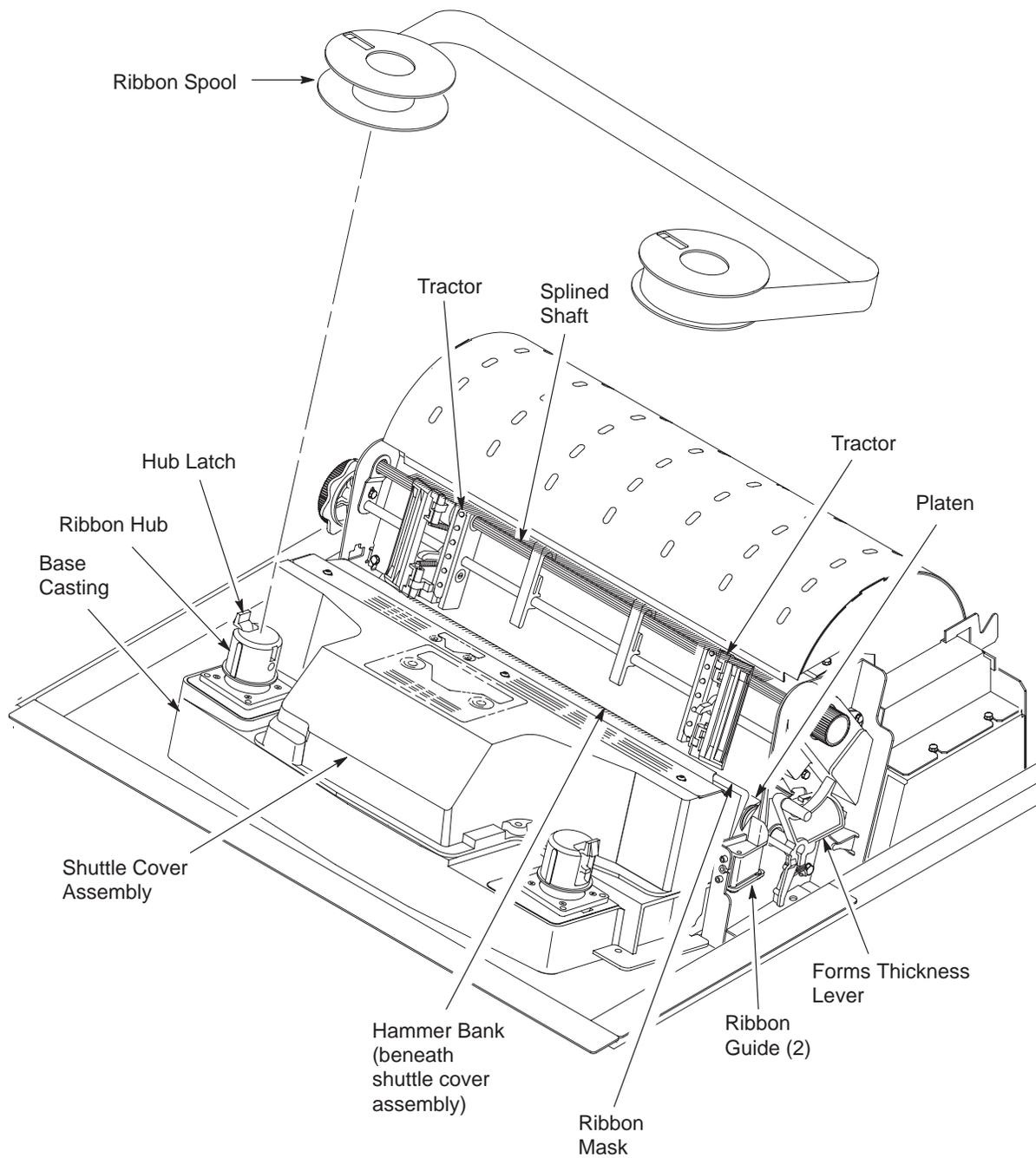
Figure 2–2. Cabinet Model Component Locations (Cont.)

Figure 2–3. Pedestal Model Component Locations

Ribbon Spool

Printer Cover

Adjustable
Paper Guide

Adjustable
Hinge

Shuttle
Cover
Assembly

Splined
Shaft

Ribbon Hub

Forms
Thickness
Lever

Ribbon Guide
(1 of 2)

Hub Latch
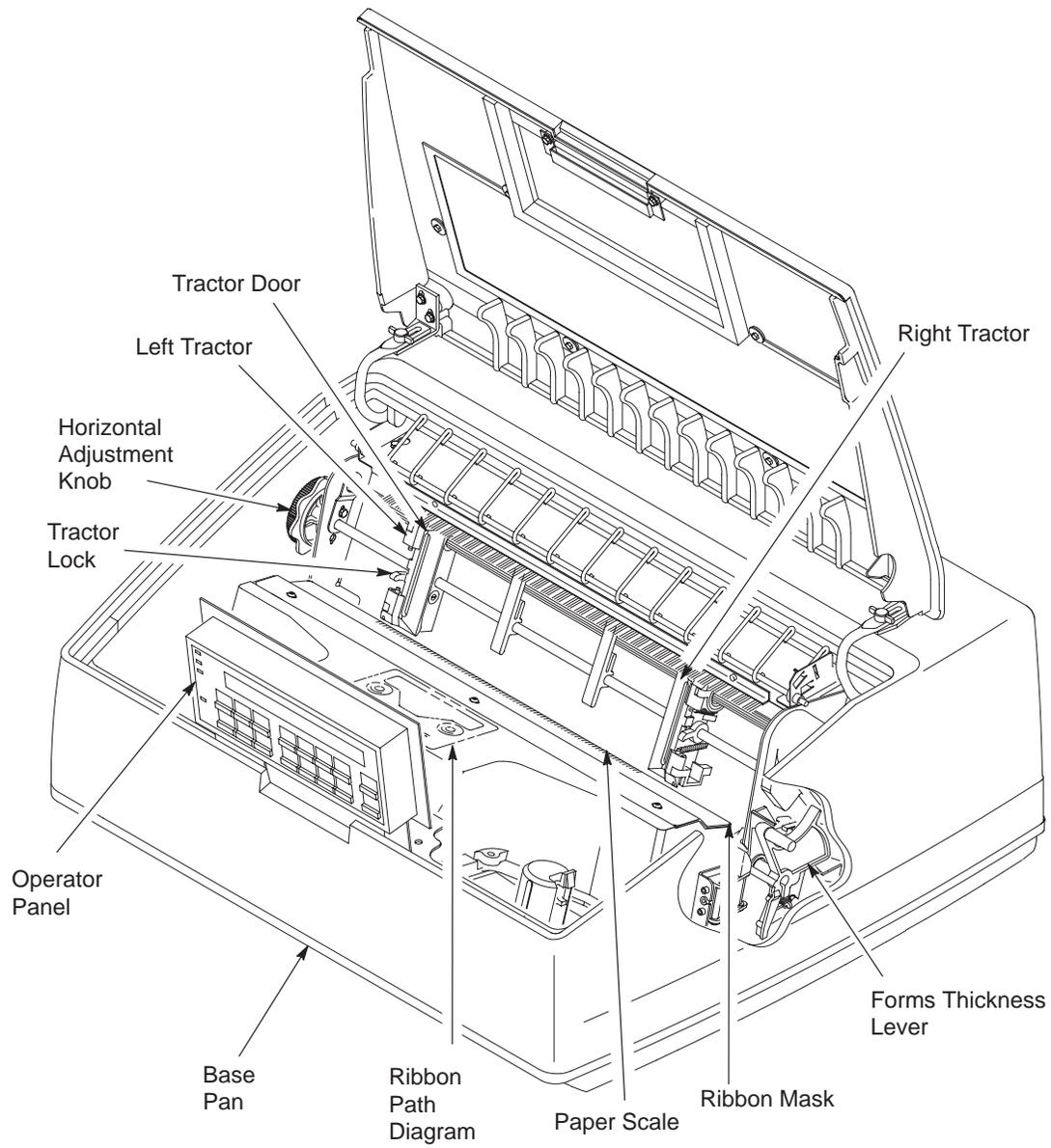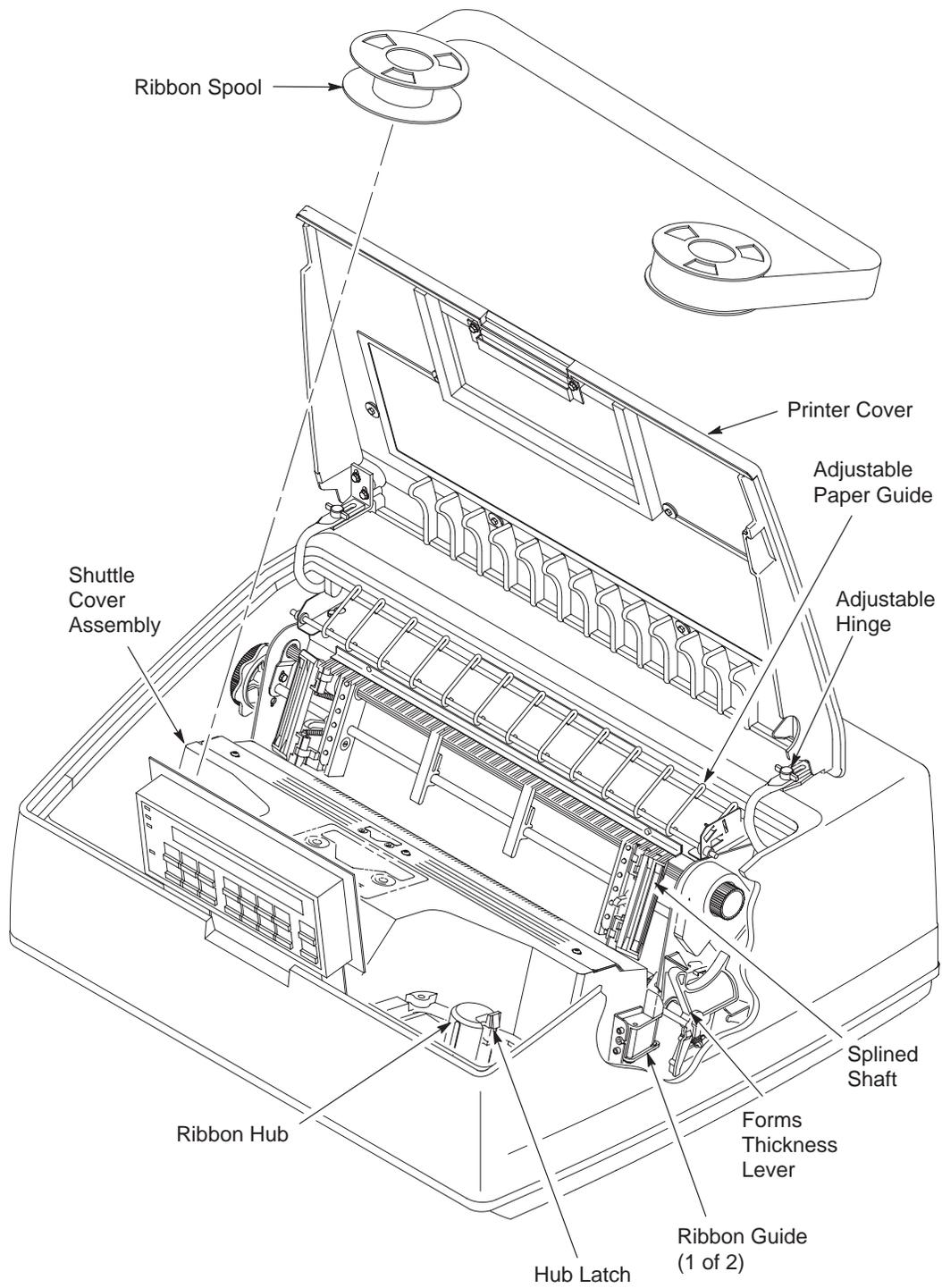
Figure 2–3. Pedestal Model Component Locations (Cont.)

Removing Shipping Restraints (Cabinet Models)

Follow the instructions on the shipping package to perform these steps:

1. Remove shipping restraints from front of shipping pallet.

2. Move printer from shipping pallet.

3. Remove remaining shipping restraints from pallet.

4. Remove remaining packing material.

Cardboard packing, protective foam, and tie wraps protect printer mechanisms from possible damage during shipment. You must remove these shipping restraints before you operate the printer.

Save the cardboard packing and protective foam with the other packing materials.

To avoid shipping damage, reinstall the shipping restraints whenever the printer is moved or shipped. To reinstall the shipping restraints, simply reverse the steps in this section.

Remove the Cardboard Packing and Envelope

Cardboard
Packing
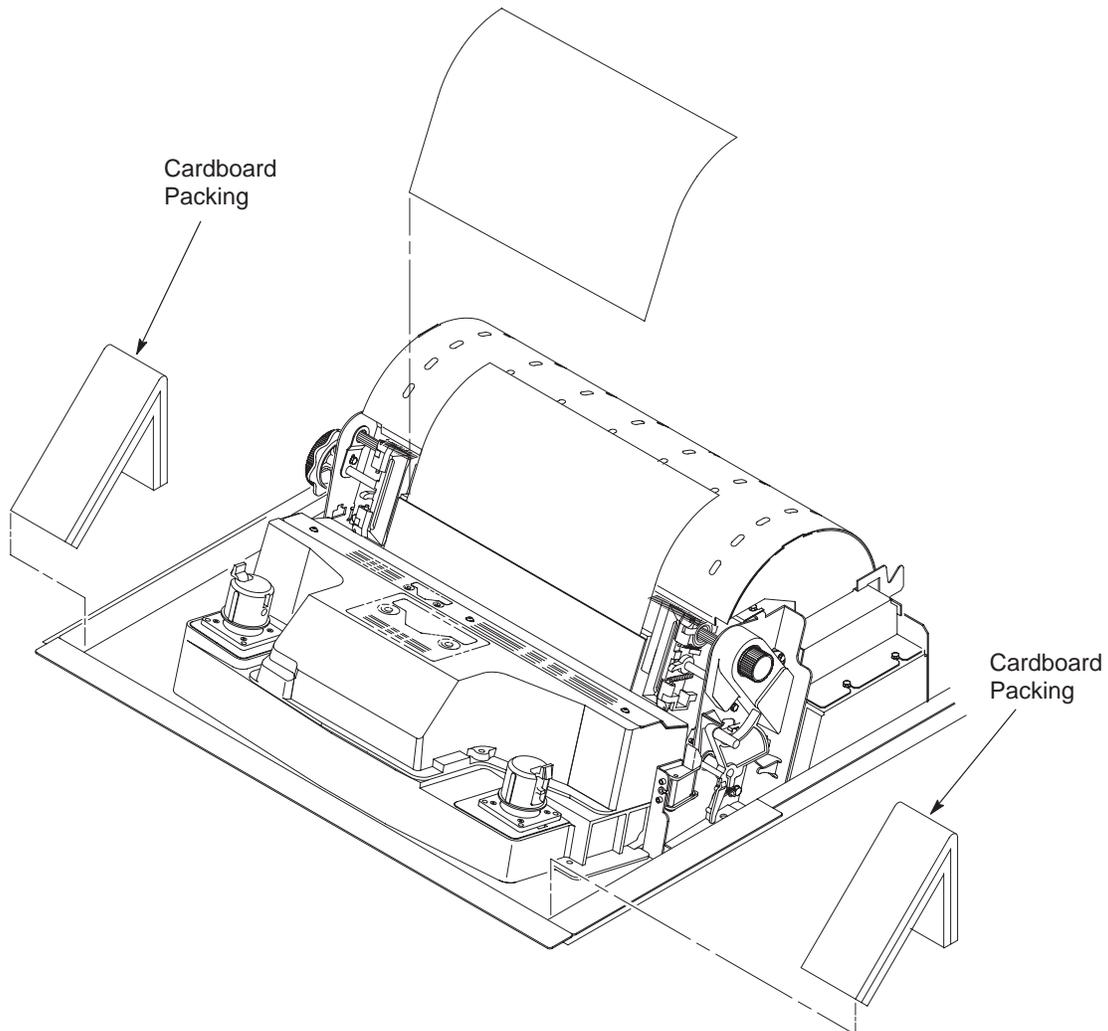
Cardboard
Packing

Figure 2–4. Removing the Cardboard Packing and Envelope

1. Raise the printer cover.

2. Remove the cardboard packing.

3. Open the tractor doors. Push the tractor locks down. Slide the tractors outward as far as they will go. The forms thickness lever should be in the fully open (raised) position.

4. Remove the envelope that contains the sample configuration printout. Store this in the pouch that is attached to the left interior side of the cabinet.

Remove the Hammer Bank Protective Foam
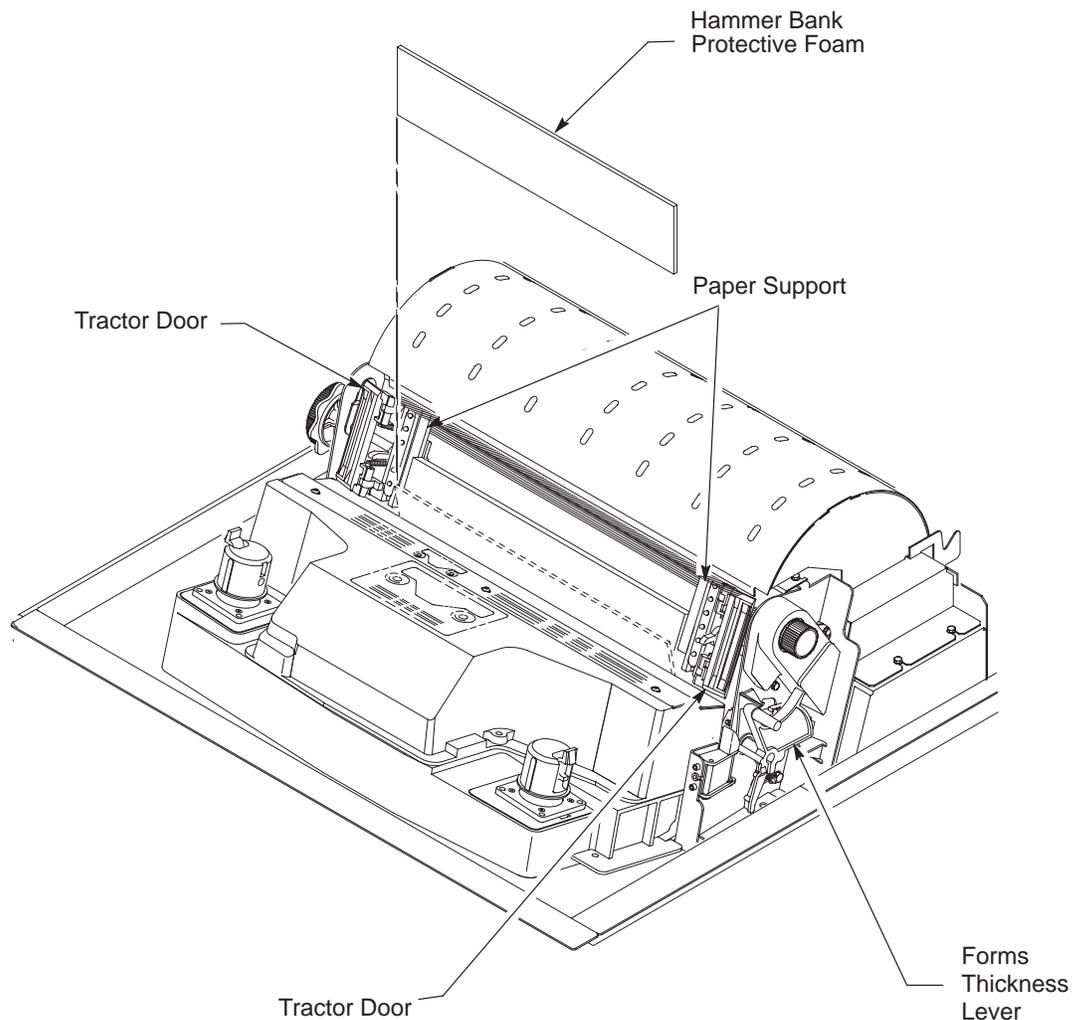
Figure 2–5. Removing the Hammer Bank Protective Foam

1. Slide the paper supports outward as far as they will go. Lift the hammer bank protective foam and remove it from between the ribbon mask and the platen.

2. Rotate the forms thickness lever downward to position "A."

Remove the Platen Protective Foam
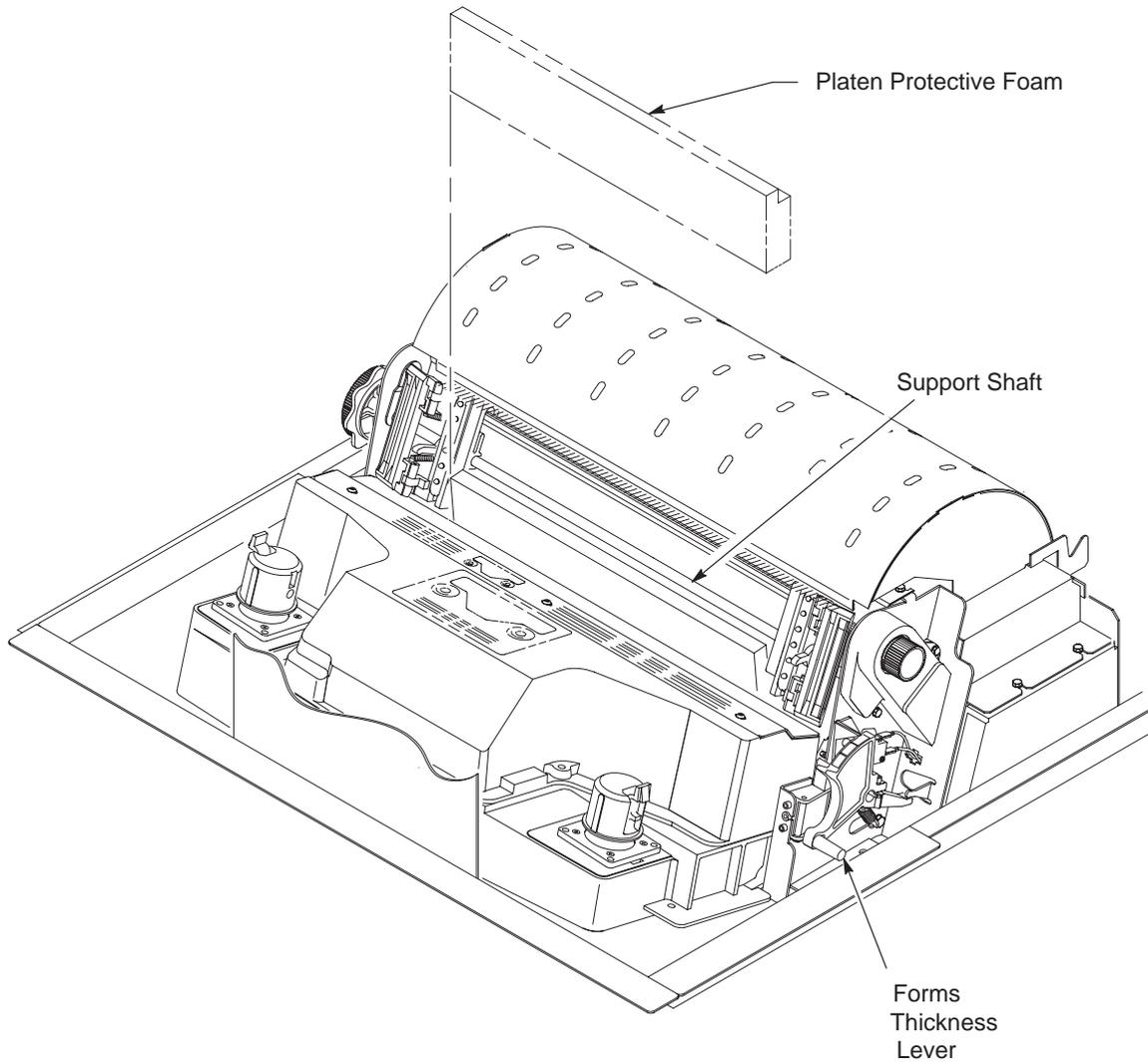
Figure 2–6. Removing the Platen Protective Foam

1. Rotate the platen protective foam toward the front of the printer and out from under the support shaft. Remove the platen protective foam.

Remove the Foam Strips and Protective Film

Protective Film

Foam Strip
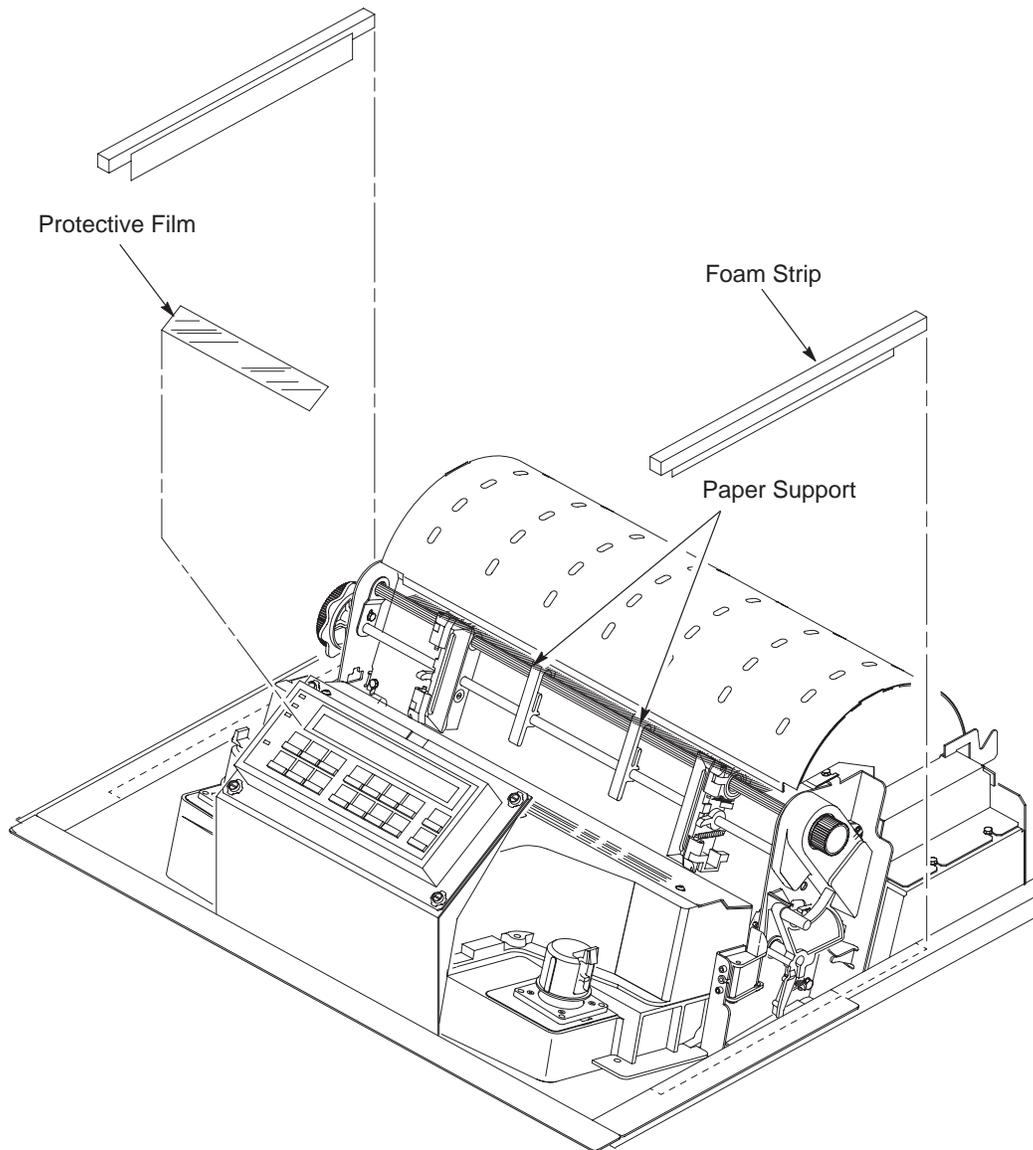
Paper Support

Figure 2–7. Removing the Foam Strips and Protective Film

1. Slide the two paper supports toward the center of the support shaft. Position them so that they divide the space between the tractors into three approximately equal segments. See Figure 2–7.

2. Remove the foam strips and the tape securing the foam strips.

3. Carefully peel off the tape and lift the protective film off the operator panel message display.

Release the Paper Chains
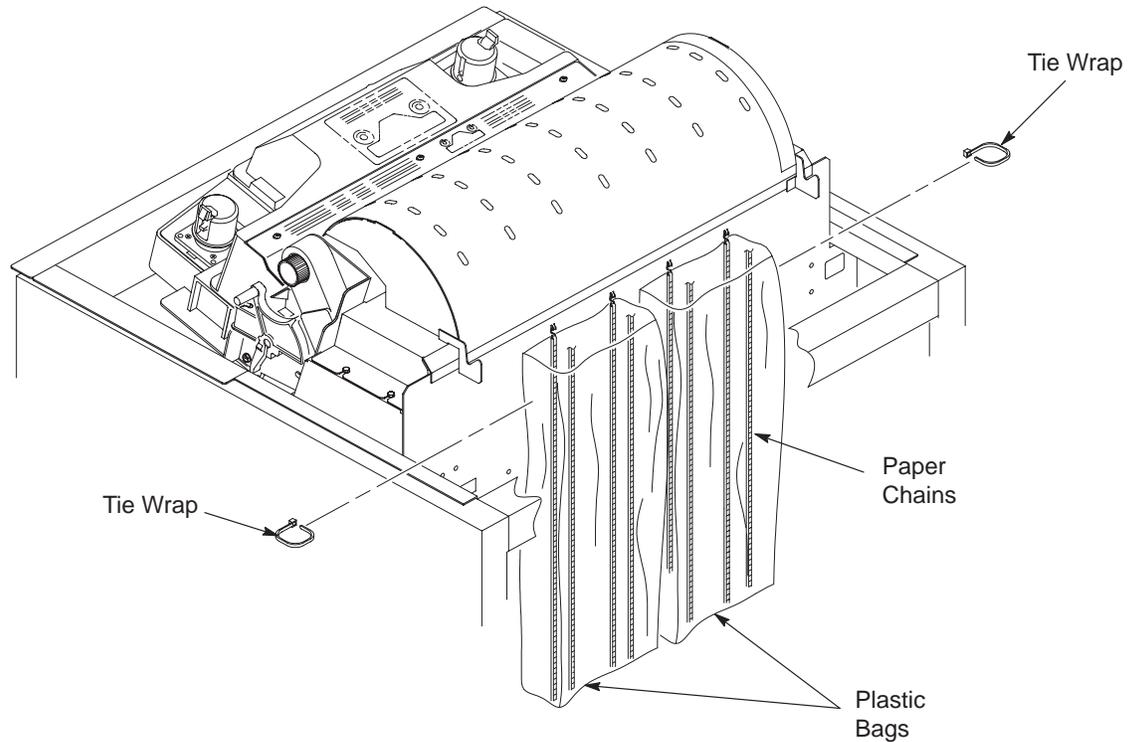
Figure 2–8. Releasing the Paper Chains

1. Open the rear cabinet door.

2. Cut the tie wraps and release the paper chains from the bags at the top rear of the printer frame. Remove the tie wraps and bags. See Figure 2–8.

3. Make sure each chain hangs freely, with no kinks or knots.

Removing Tags
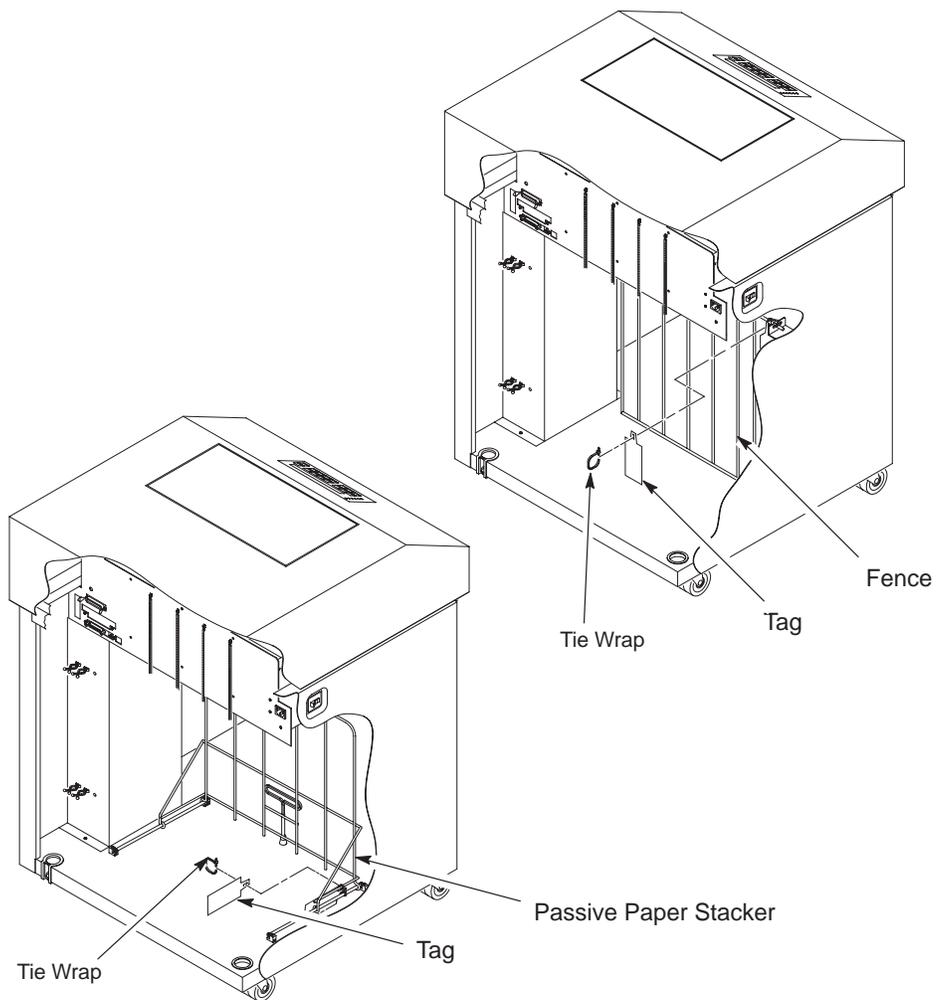
Figure 2–9. Remove Tag and Clamp from Fence or Passive Paper Stacker

1. Remove the tie wrap that is attached to the paper fence. It is marked with a large, red tag. If you have a Power Paper Stacker, skip this procedure.

2. Close the rear cabinet door.

Remove the Power Stacker Shipping Restraints

3. This section only applies to printers with the power stacker installed. The power stacker can be factory or field installed.

4. The power stacker is a vertically movable paper guide which directs the paper from the printer to the paper stack. This movement enhances the paper stacking capabilities of the printer.

5. Special packaging protects the power stacker mechanisms from damage during shipment. This section describes how to remove the shipping restraints before you operate the printer.

6. Save the packaging material, since you may need to reinstall it

7. If it is necessary to move the printer, install the shipping restraints in the same position shown. Reverse the steps in this section.

IMPORTANT

To avoid shipping damage, install the shipping restraints whenever you move or ship the printer.
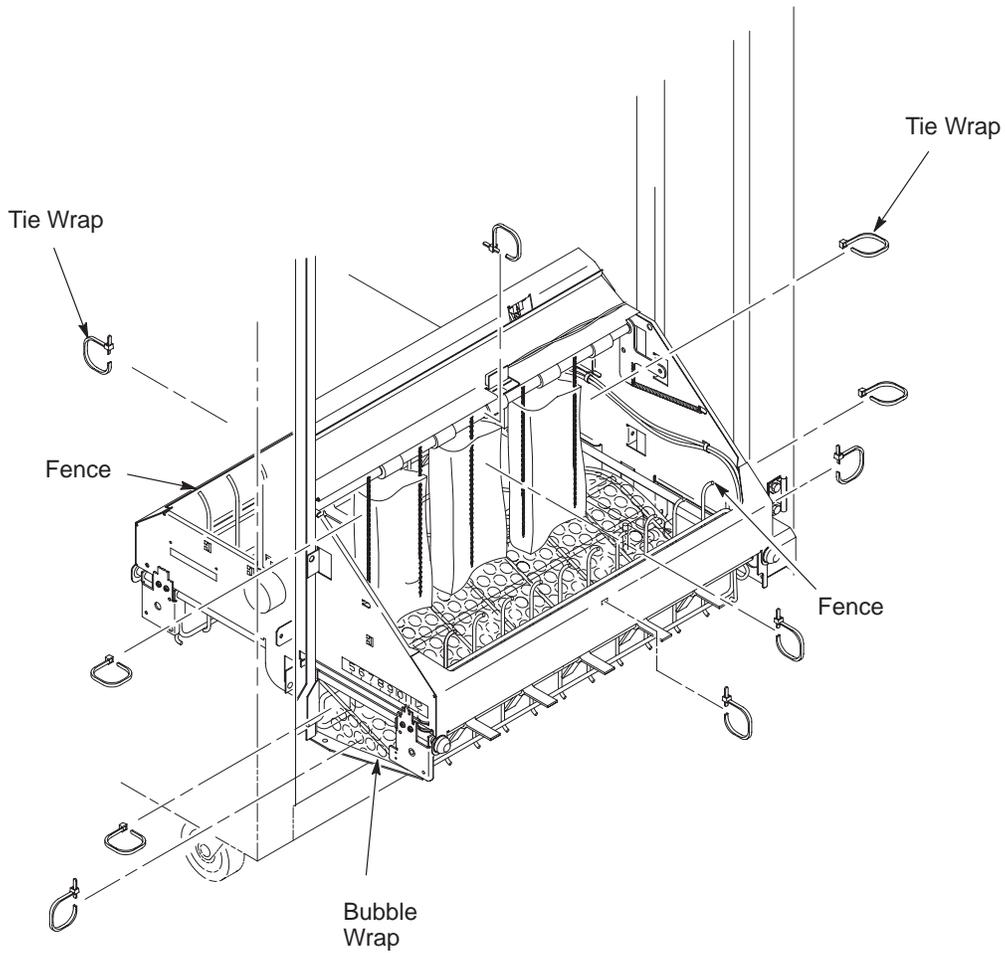
Figure 2–10. Removing the Shipping Restraints

1. Open rear door panel.

2. Remove tie wraps.

3. Raise the paper guide to its highest position by hand.

4. Remove bubble wrap.

5. Verify that both fences are in the down position.

Removing Shipping Restraints (Pedestal Models)

Protective films and foam blocks protect printer mechanisms from possible damage during shipment. You must remove these shipping restraints before you operate the printer.

Save the foam blocks with the other packing materials.

To avoid shipping damage, reinstall the shipping restraints whenever the printer is moved or shipped. To reinstall the shipping restraints, simply reverse the steps in this section.

Remove the Protective Film and Envelope

Envelope
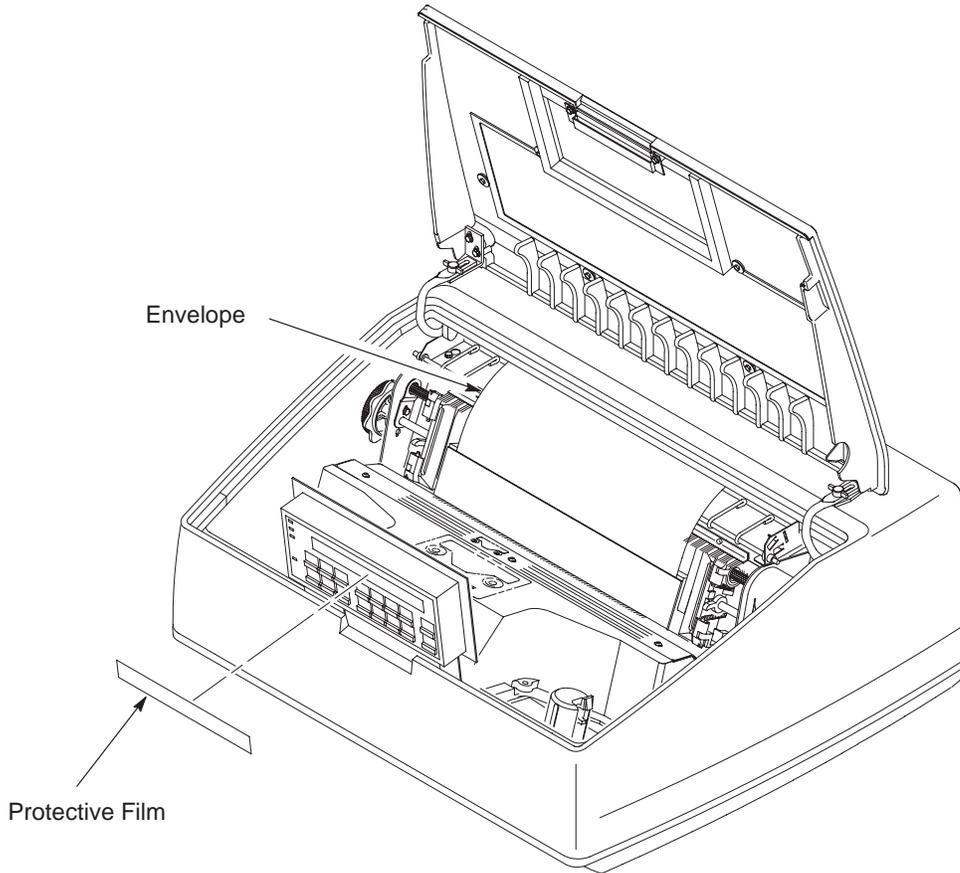
Protective Film

Figure 2–11. Removing the Protective Film and Envelope

1. Raise the printer cover.

2. Carefully peel off the tape and lift the protective film off the operator panel message display.

3. Open the tractor doors. Push the tractor locks down. Slide the tractors outward as far as they will go. See Figure 2–12. The forms thickness lever should be raised (in the fully open position).

4. Remove the envelope that contains the sample configuration printout. Store this envelope in a safe place so that you can refer to the configuration printout.

Remove the Hammer Bank Protective Foam
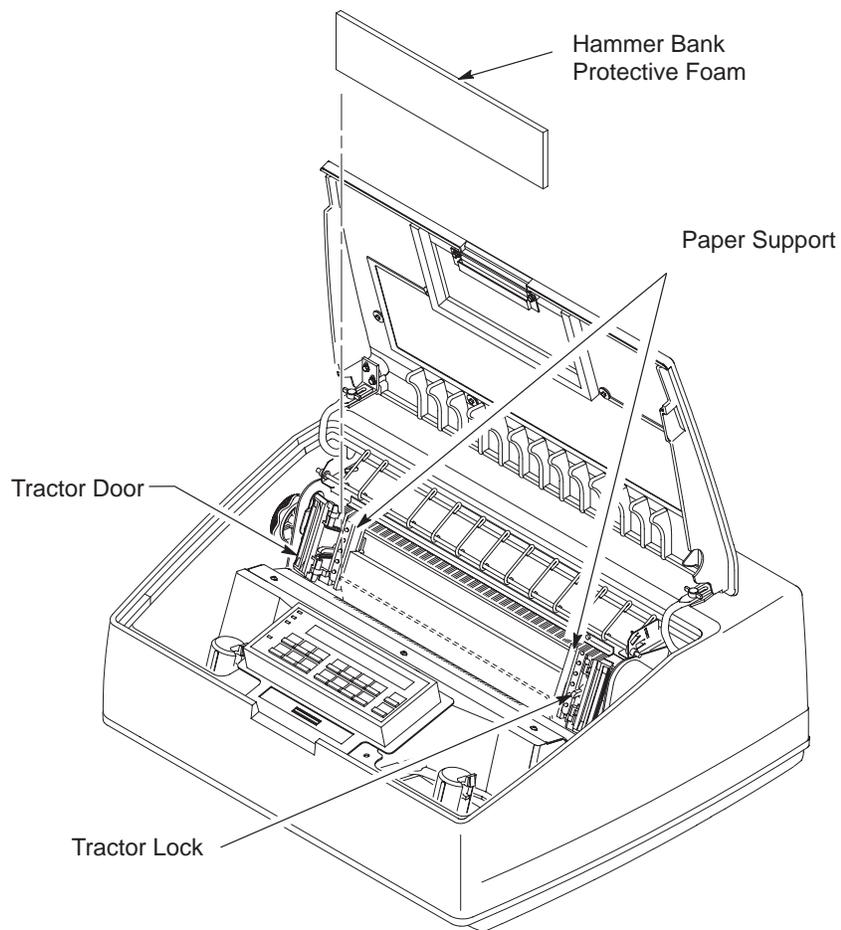
Figure 2–12. Removing the Hammer Bank Protective Foam

1. Slide the paper supports outward as far as they will go.

2. Lift the hammer bank protective foam and remove it from between the ribbon mask and the platen.

Remove the Platen Protective Foam

Platen Protective Foam

Support Shaft

Forms Thickness Lever
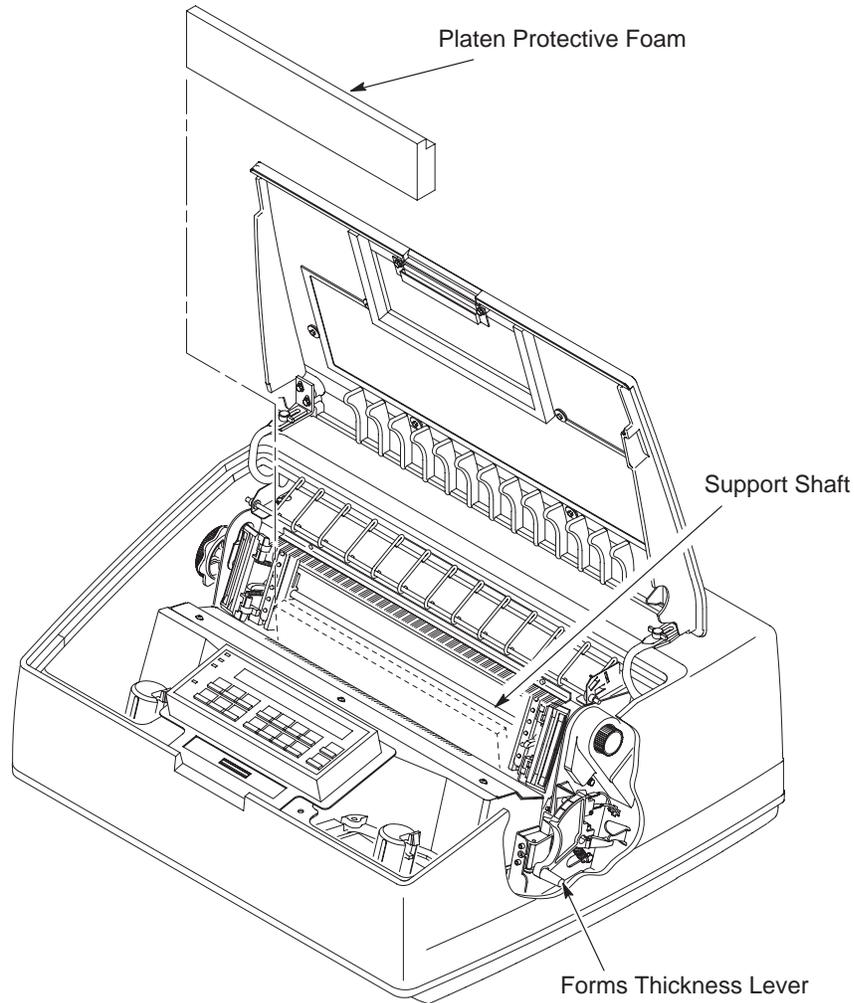
Figure 2–13. Removing the Platen Protective Foam

1. Rotate the forms thickness lever downward (to position "A"). See Figure 2–13.

2. Rotate the platen protective foam toward the front of the printer and out from under the support shaft. Remove the platen protective foam.

Attach the Input Paper Shelf and Output Basket
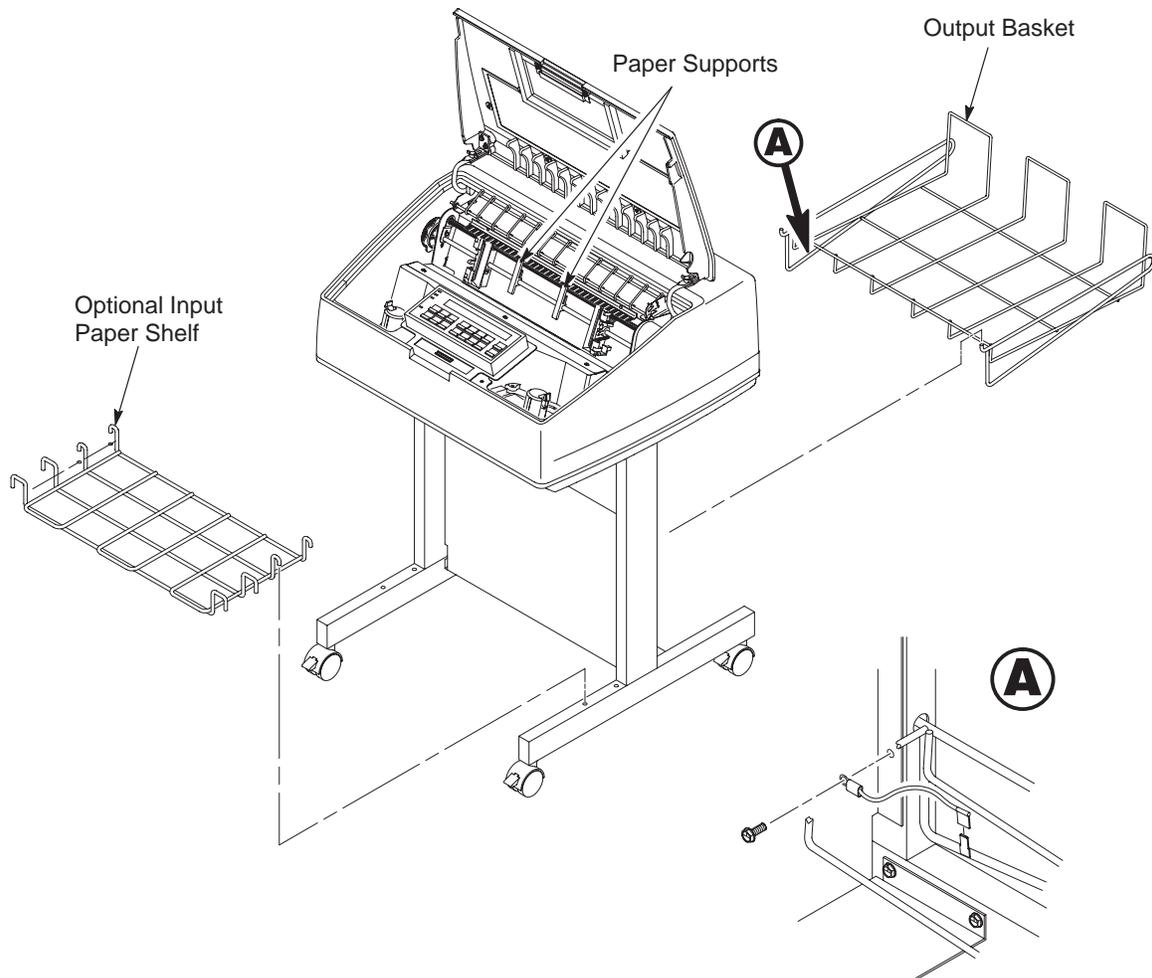
Figure 2–14. Attaching the Input Paper Shelf and Output Basket

1. Slide the two paper supports toward the center of the support shaft. Position them so that they divide the space between the tractors into three approximately equal segments. See Figure 2–14.

2. Place the output basket in the holes on the back of the printer.

3. Place the input paper shelf (which is an optional feature) in the holes in the front of the pedestal base.

Connect the Interface and Power Cables (Cabinet Models)

⚠ **DANGER:**

> **<1>** Before powering on the printer ensure the printer is plugged into an appropriate power source. Refer to Chapter 2 of the Setup Guide for information on the proper source.
>
> **<4>** Do not connect or disconnect any communication port, teleport, attachment connector, or power cord during an electrical storm.
>
> **<5>** Power off the print and disconnect the power cord before connecting or disconnecting communication port, teleport, or attachment cable connector.

1. Verify that the voltage source at the printer site conforms to the requirements specified on page 2–6. Make sure that the printer power switch is set to Off. See Figure 2–15.

2. Open the front cabinet door, remove and open the cardboard box containing the power cord, printer ribbon, and operator panel overlay label. Refer to Appendix A, "Printer Specifications," for recommended cables. Documentation is stored in a pouch container on the left interior side of the cabinet.

3. Referring to Figure 2–15 through Figure 2–20, connect the customer-supplied interface cable from the host computer to the appropriate printer interface connector.

4. Thread the power cable connector up through the notch in the lower right back corner of the cabinet (see Figure 2–15). Plug the power cord into the printer AC power connector, then into the AC power outlet.
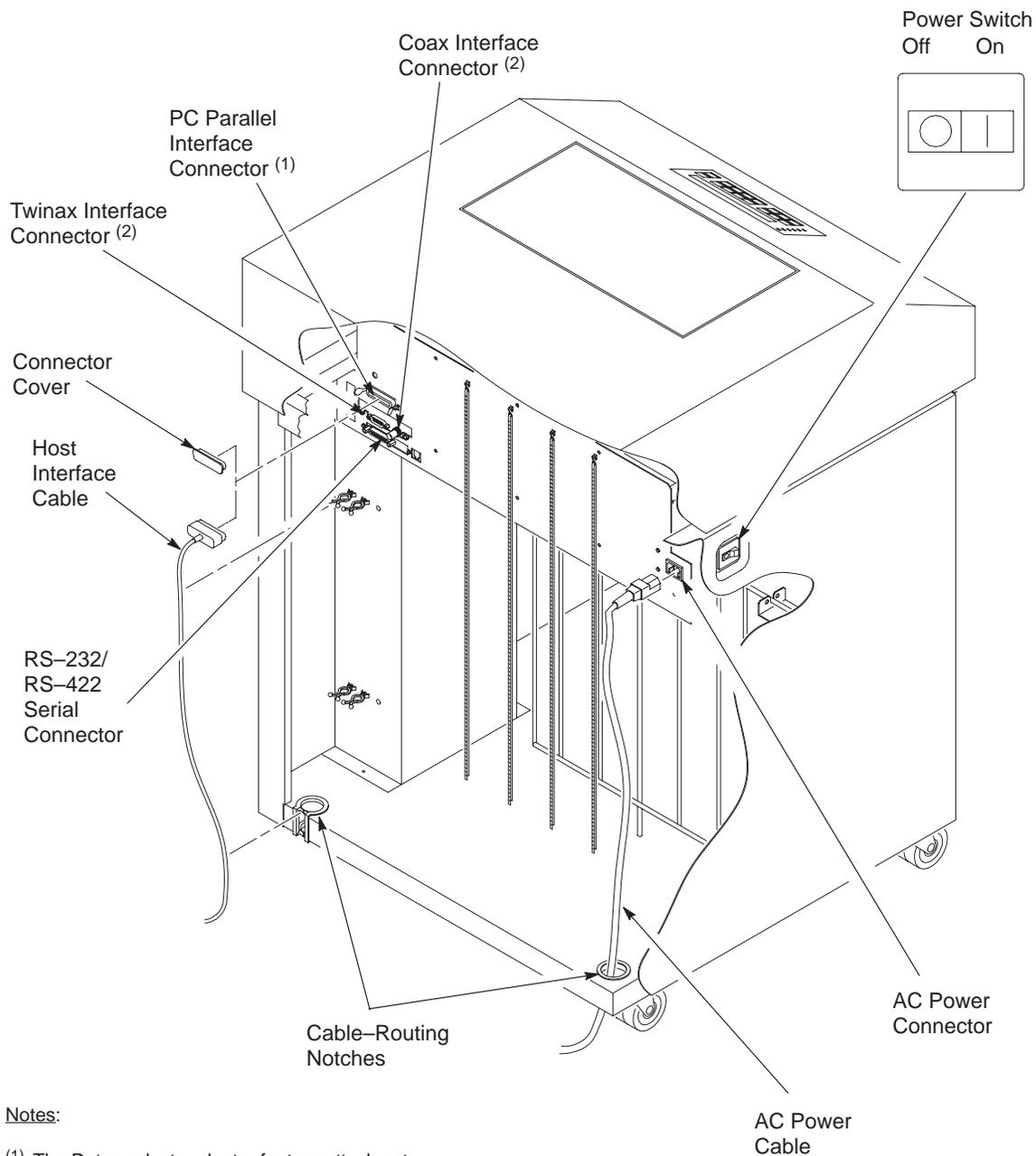
Figure 2–15. Interface and Power Cable Connections, Cabinet Models

Power Switch
Off   On

Coax Interface
Connector [2]

PC Parallel
Interface
Connector [1]

Twinax Interface
Connector [2]

Connector
Cover

Host
Interface
Cable

RS–232/
RS–422
Serial
Connector

Cable–Routing
Notches

AC Power
Connector

AC Power
Cable

Notes:

[1] The Dataproducts adapter feature attaches to
     the PC Parallel interface connector.

[2] Twinax, Coax, and Ethernet Interfaces
     appear only if these features are installed.

The Multi–Platform Interface Coax/Twinax
feature is not shown in this illustration. Refer to
the *Coax/Twinax Multi–Platform Interface Option
Installation and Operation Guide* for an
illustration of this feature.

Figure 2–16. Product Description Label Location

1. Check the product description label to verify that the voltage source at the printer site conforms to the requirements specified on page 2–6.
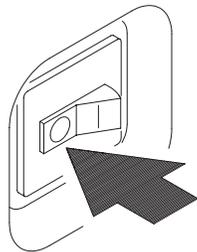
Figure 2–17. Power Switch

2. Make sure the printer power switch is set to **OFF**.

Parallel Connector

Serial Connector
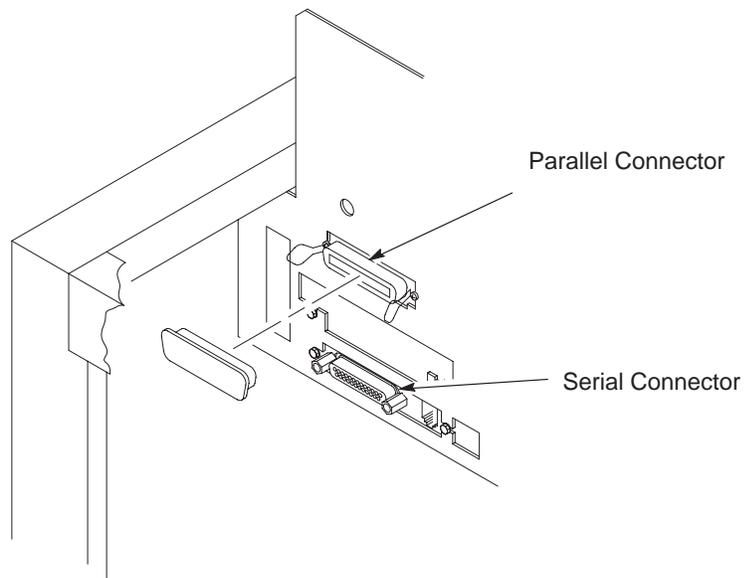
Figure 2–18. Removing the I/O Cover

3. Open the rear cabinet door, and remove the cover from the I/O
    connector you have selected.
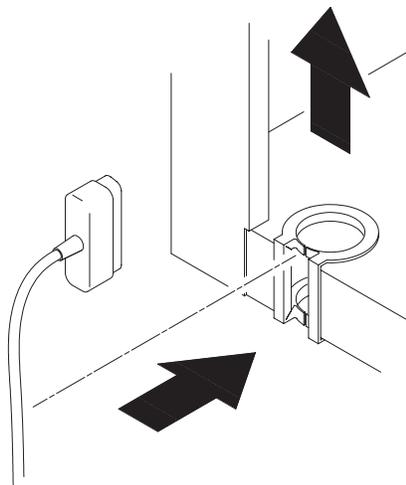
Figure 2–19. Cable Routing Notch

4. Locate the notch in the lower left corner of the back of the
    cabinet.

5. Hold the I/O cable below its connector, and gently push the cable through the opening in the grommet seated in the notch.
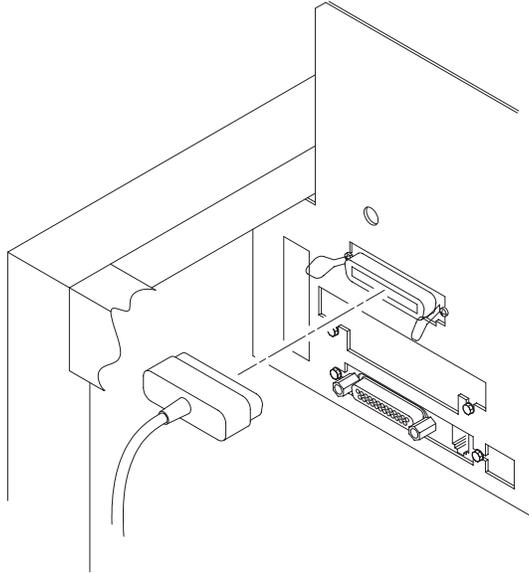
Figure 2–20. Cable Connector Attachment

6. Pull the cable up through the notch until it reaches the I/O plate. Attach the cable connector to the printer interface connector previously selected in step 3 of this section. Secure the cable to the printer using the two cable standoffs. See Figure 2–15.
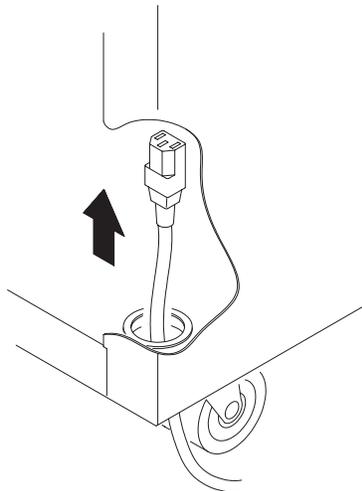
Figure 2–21. Routing the Power Cord

7. Guide the power cord up through the hole in the lower right back corner of the cabinet. Thread the power cord inside the bracket where the gas spring is attached.
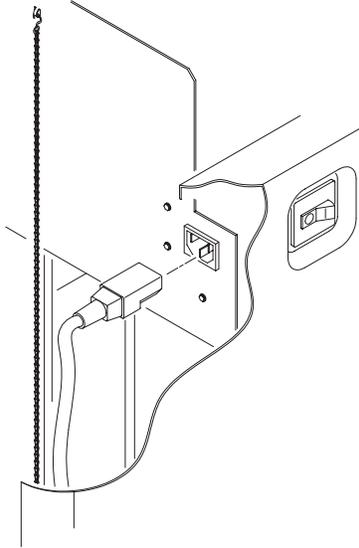
Figure 2–22. Attaching the Power Cord

8. Plug the power cord into the printer AC power connector, then into the AC power outlet.

Connect the Interface and Power Cables (Pedestal Models)

 DANGER:

> **<1>** **Before powering on the printer ensure the printer is plugged into an appropriate power source. Refer to Chapter 2 of the Setup Guide for information on the proper source.**
>
> **<4>** **Do not connect or disconnect any communication port, teleport, attachment connector, or power cord during an electrical storm.**
>
> **<5>** **Power off the print and disconnect the power cord before connecting or disconnecting communication port, teleport, or attachment cable connector.**

1. Verify that the voltage source at the printer site conforms to the requirements specified on page 2–6. Make sure that the printer power switch is set to Off. (See Figure 2–23.)

2. Open the box containing the power cord, printer ribbon, and operator panel overlay label. Refer to Appendix A, "Printer Specifications," for recommended cables.

3. Referring to Figure 2–23, connect the (customer-supplied) interface cable from the host computer to the appropriate printer interface connector:

   a. Remove the cover from the I/O connector(s) you have selected.

   b. Attach the cable connector to the printer interface connector.

4. Plug the power cord into the printer AC power connector, then into the AC power outlet (see Figure 2–23).
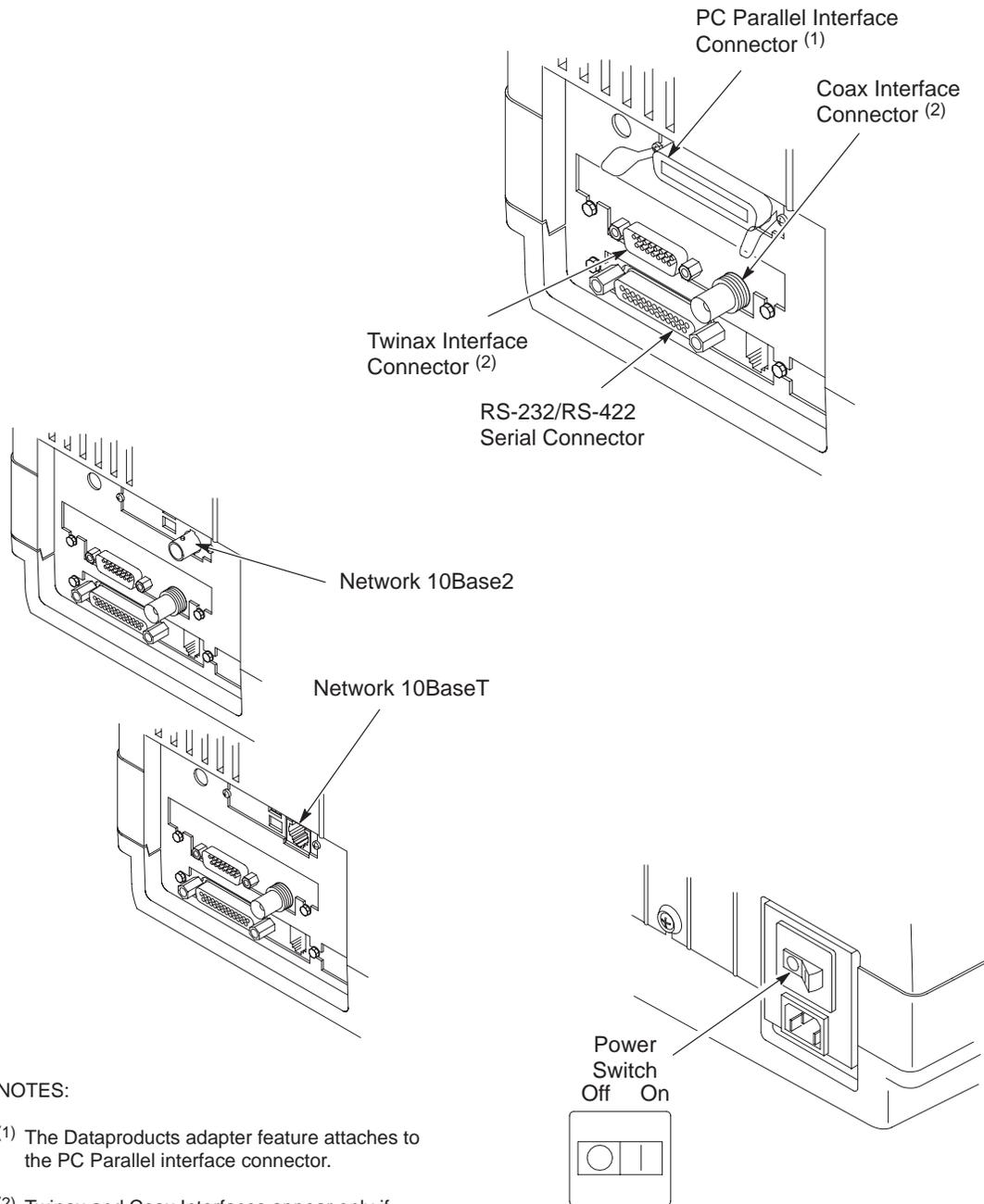
PC Parallel Interface
Connector [1]

Coax Interface
Connector [2]

Twinax Interface
Connector [2]

RS-232/RS-422
Serial Connector

Network 10Base2

Network 10BaseT

Power
Switch
Off   On

NOTES:

[1] The Dataproducts adapter feature attaches to
the PC Parallel interface connector.

[2] Twinax and Coax Interfaces appear only if
these features are installed.

The Multi–Platform Interface Coax/Twinax feature
is not shown in this illustration. Refer to the Coax/
Twinax Multi–Platform Interface Option Installa-
tion and Operation Guide for an illustration of this
feature.

Figure 2–23. Interface and Power Cable Connections, Pedestal Models
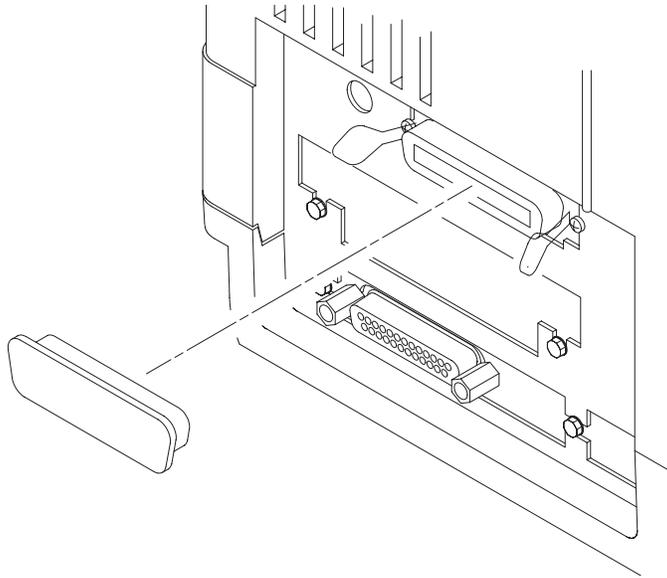
Figure 2–24. Removing the I/O Cover

5. Remove the cover from the I/O connector you have selected.
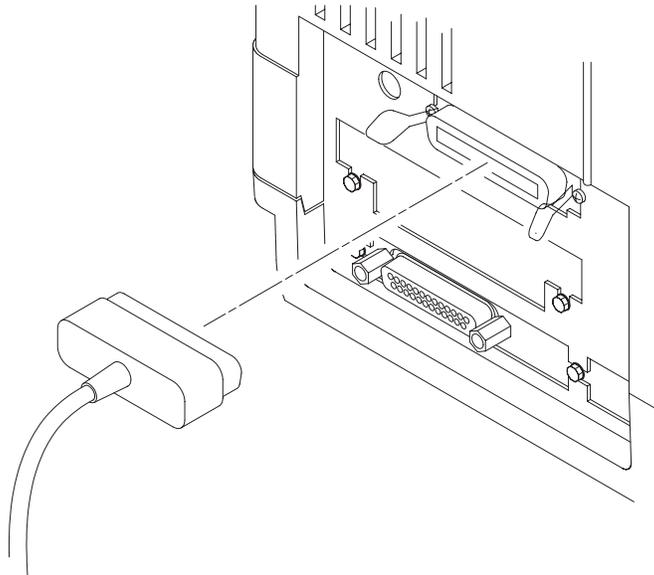
Figure 2–25. Attaching the Cable Connector

6. Attach the cable connector to the printer interface connector.
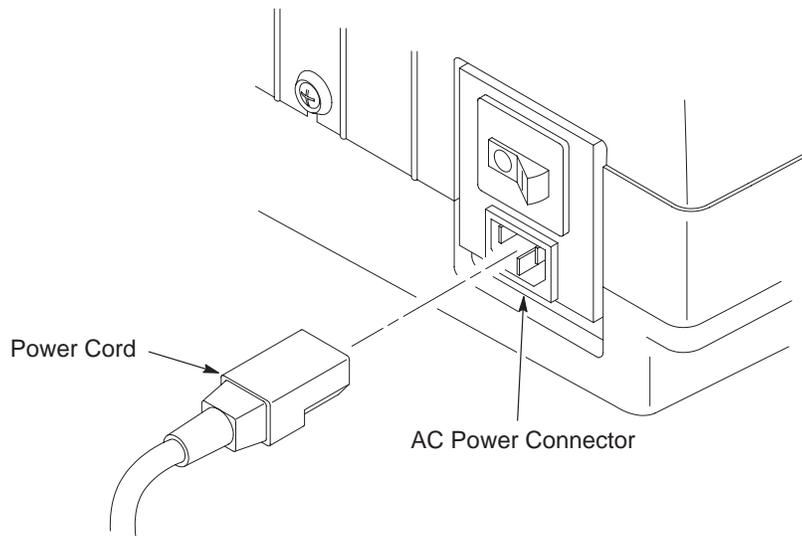
Figure 2–26. Attaching the Power Cord

7. Plug the power cord into the printer AC power connector, then into the AC power outlet.

Dataproducts I/O Adaptor

Parallel[1]
Auxiliary I/O
Diagnostic
Serial RS232/RS422

Pedestal Model

Dataproducts Standard Adapter

Parallel[1]
Auxiliary I/O
Diagnostic
Serial RS232/RS422

Cabinet Model
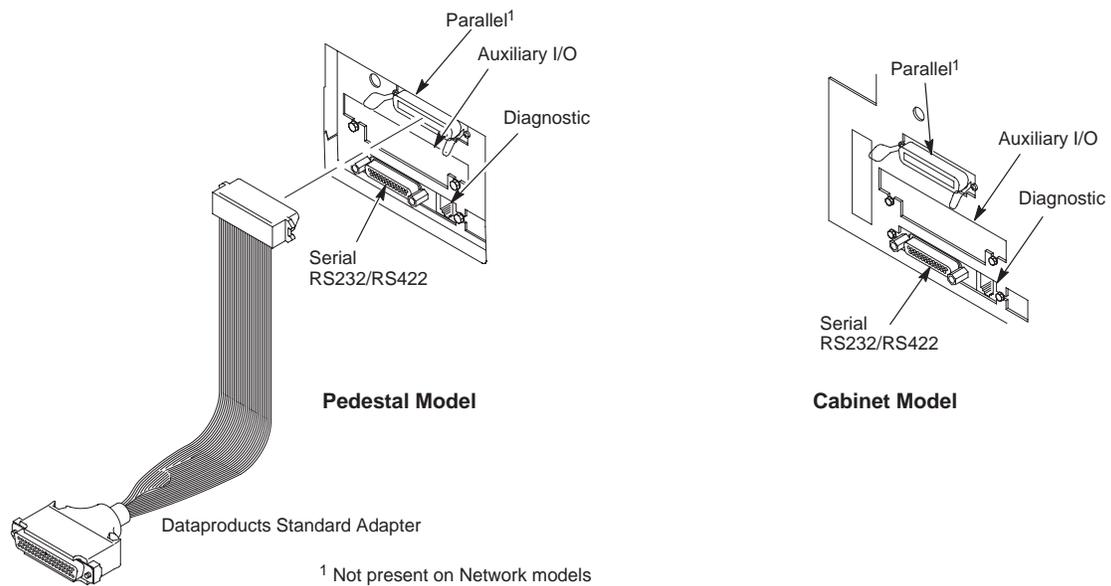
[1] Not present on Network models

Figure 2–27. Dataproducts I/O Adaptor

Optional Interfaces for Auxiliary I/O

Network 10 Base 2

Network 10 Base T

Coax / Twinax

90° BNC connector required for Coax connection with the Power Stacker.
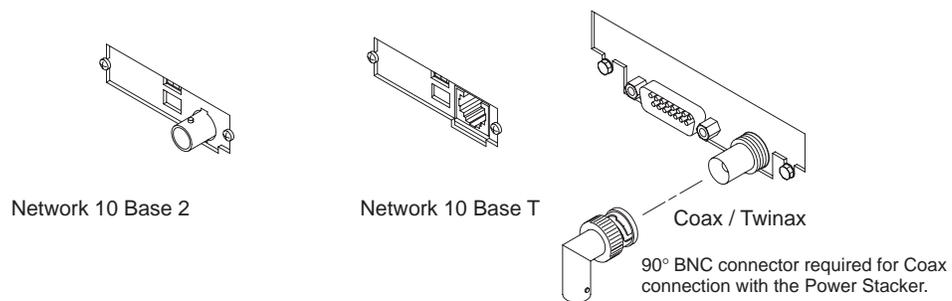
Figure 2–28. Optional Interfaces for Auxiliary I/O

Attach the Operator Panel Overlay Label

Attach the operator panel overlay label by adhering it to your operator panel. See Figure 2–29.

Power		**READY**								
Ready										
Processing										
		Menu	Scroll ↑	Enter	Micro ↑	Line Feed	Form Feed	Start	Cancel	
Attention		Printer Con–figuration	Scroll ↓	Return	Micro ↓	View	Set Top of Form	Stop	Eject/ Restore	
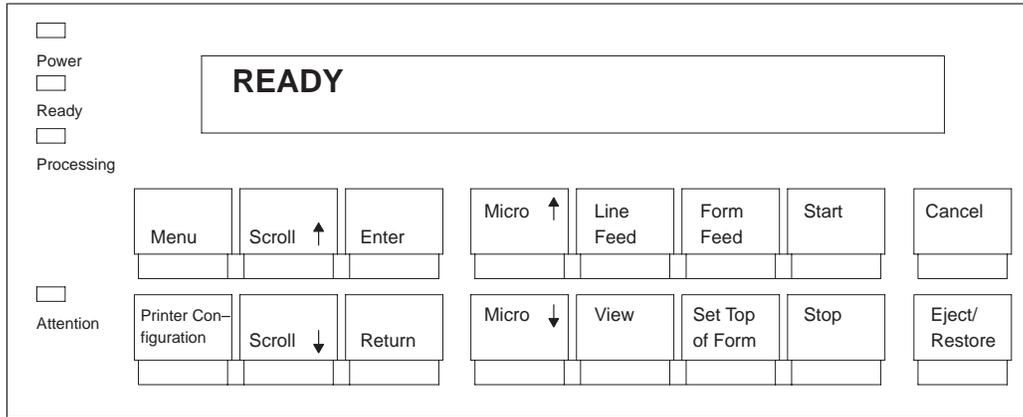
Figure 2–29. The Operator Panel Overlay Label

Install the Ribbon

1. Refer to the ribbon path diagram molded onto the shuttle cover for the following steps. See Figure 2–2.
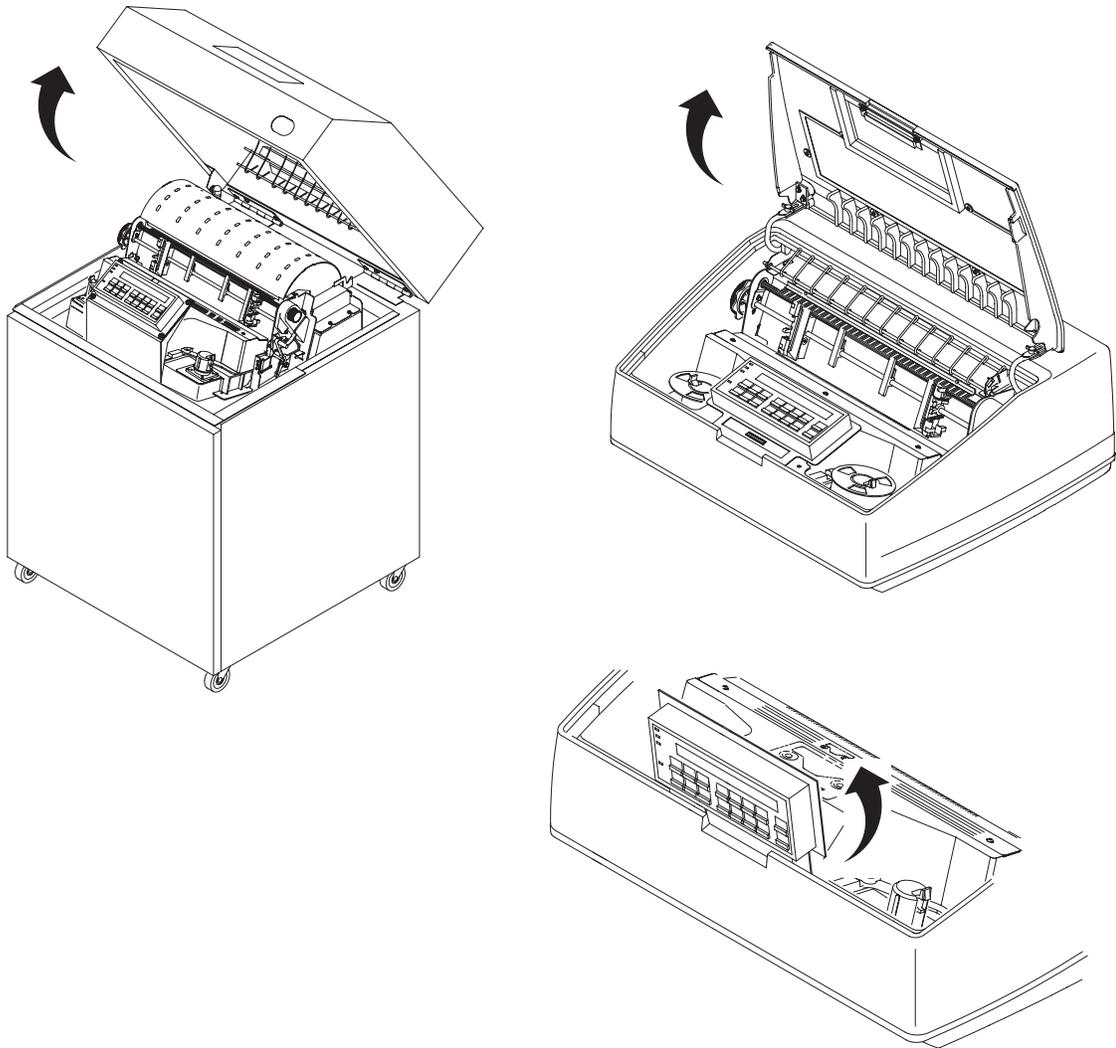
Figure 2–30. Opening the Printer Cover

2. Open the printer cover. See Figure 2–30.

3. On pedestal models, swing the operator panel out of the way. The operator panel can be pulled toward you to provide clearance. See Figure 2–30.

Tractor Door

Forms
Thickness
Lever
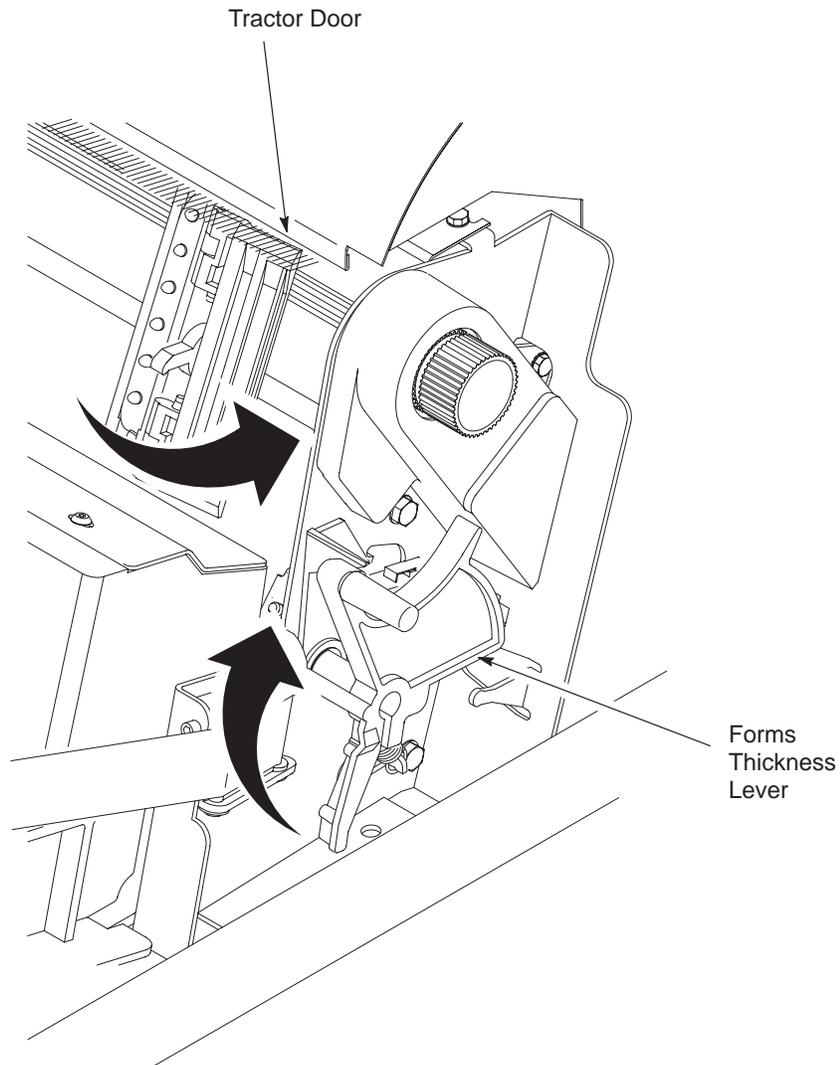
Figure 2–31. Forms Thickness Lever

4. Raise the forms thickness lever as far as it will go. See Figure 2–31.

5. Open the tractor doors. See Figure 2–31.

6. Remove the ribbon spools from the package.

Hub Latch

Hammer
Bank
Cover

Ribbon Mask

Right
Ribbon
Hub
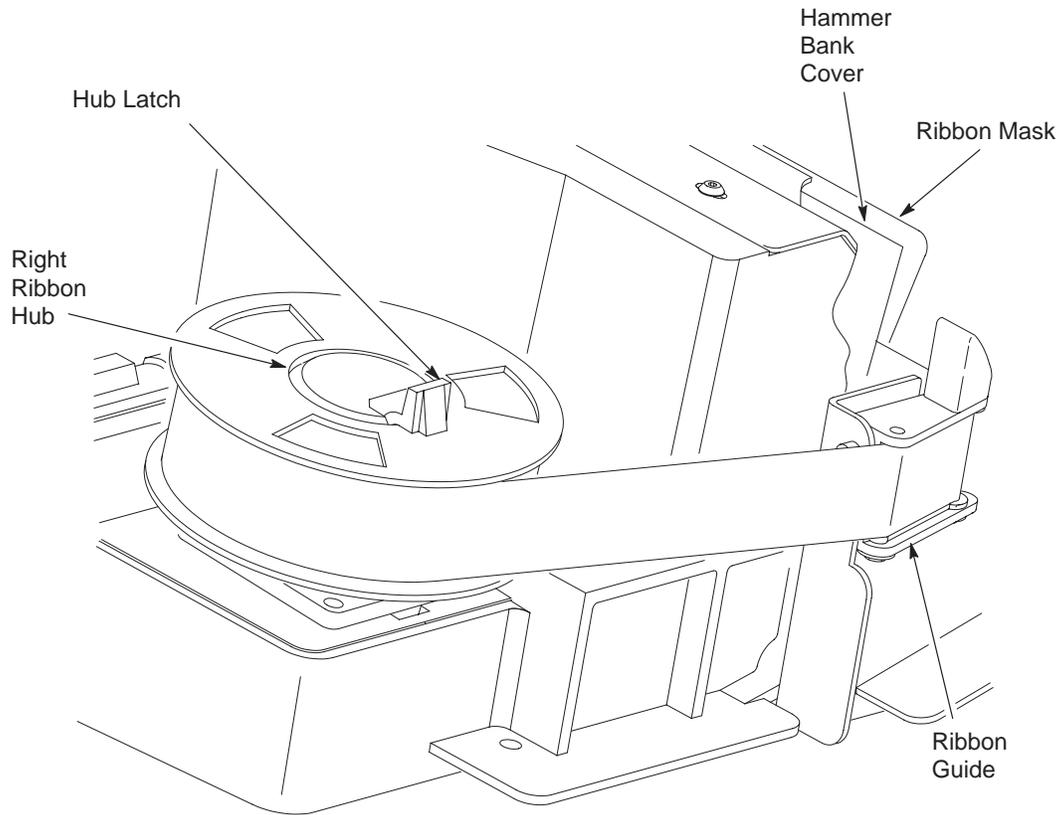
Ribbon
Guide

Figure 2–32. Right Ribbon Hub

7. With the ribbon supply to the outside, squeeze the right hub latch and place the full spool on the right ribbon hub. Press the spool down until the hub latch snaps into place. See Figure 2–32.

Paper

Ribbon Mask

Hammer Bank Cover

Platen

Ribbon

Front of
Printer

Hammer
Tip
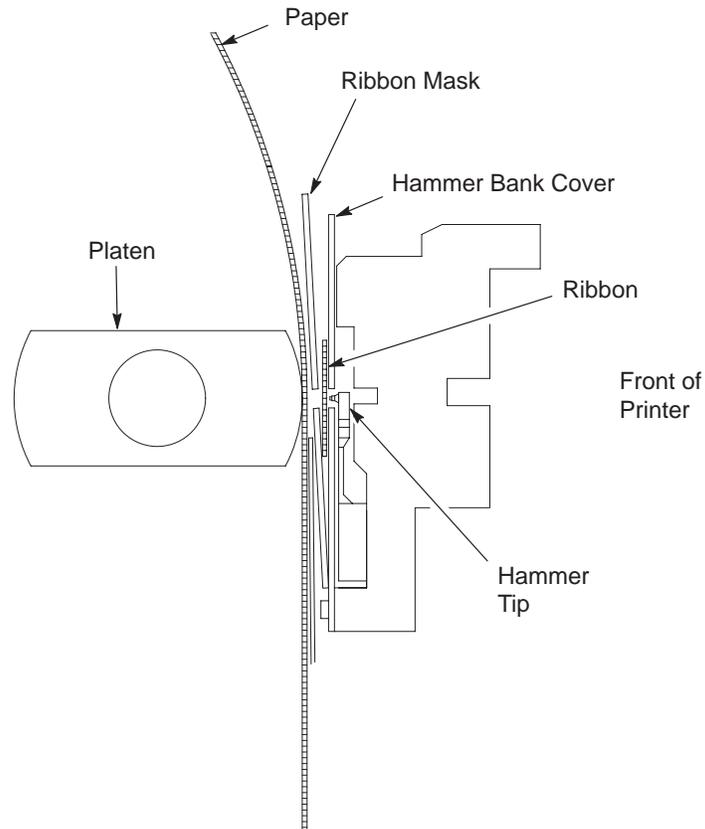
Figure 2–33. Ribbon Path

8. Referring to Figure 2–33 and the ribbon path diagram on the shuttle
   cover, thread the ribbon as follows:

   Starting from the right ribbon spool, thread the ribbon around the right
   ribbon guide, under the right tractor door, between the hammer bank
   cover and ribbon mask, and along the ribbon path to the left ribbon
   guide.

NOTE: The ribbon must not be twisted. A twisted ribbon can lower print
quality, shorten ribbon life, and cause paper or ribbon jams.

9. Referring to Figure 2–34, squeeze the left hub latch and place the empty spool on the left ribbon hub. Press the spool down until the hub latch snaps into place. Turn the left spool by hand and check to ensure that the ribbon tracks correctly in the ribbon path and around the ribbon guides.

10. Close the forms thickness lever.

11. Continue with the next procedure to load paper in the printer.
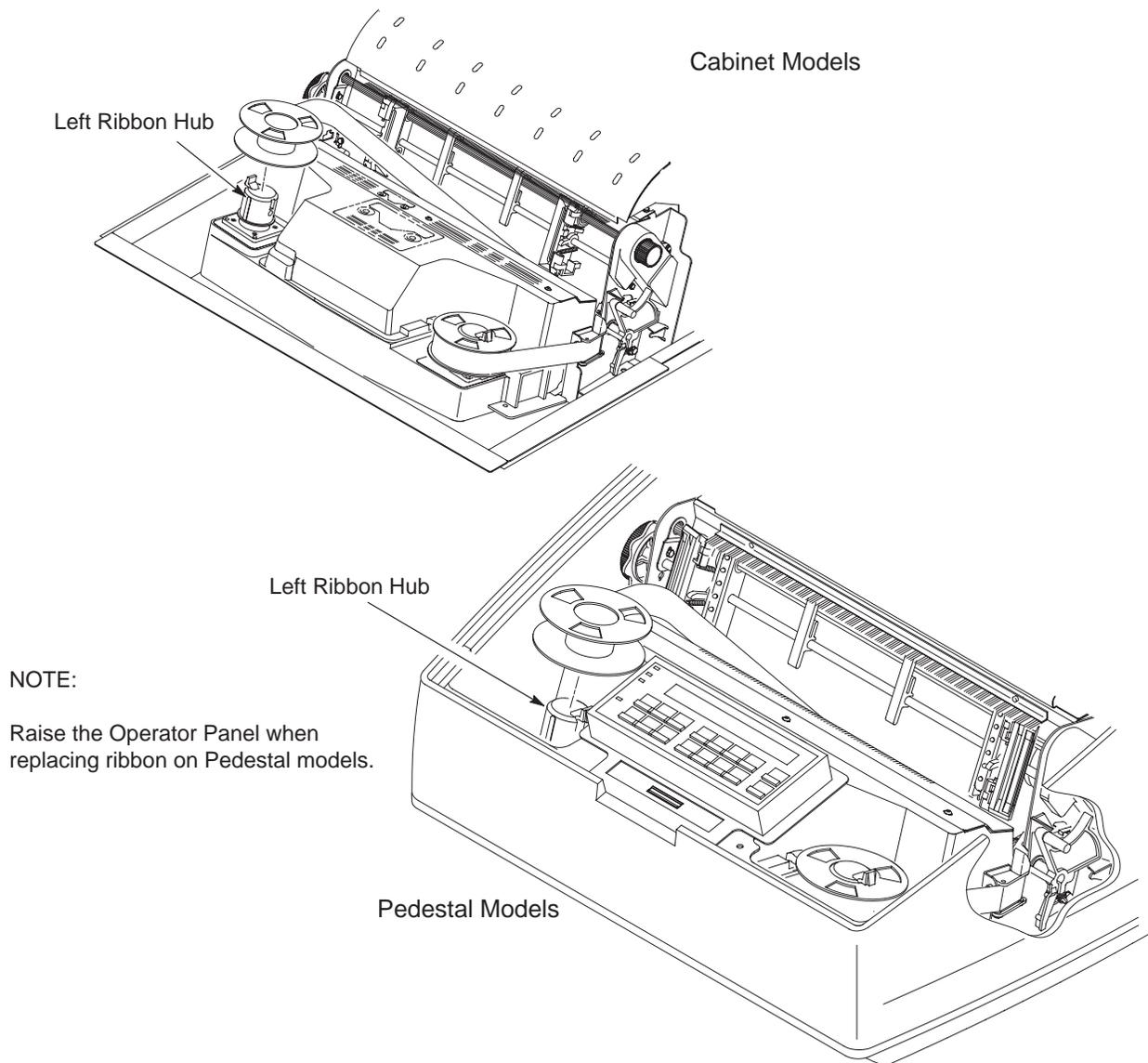
Figure 2–34. Left Ribbon Hub
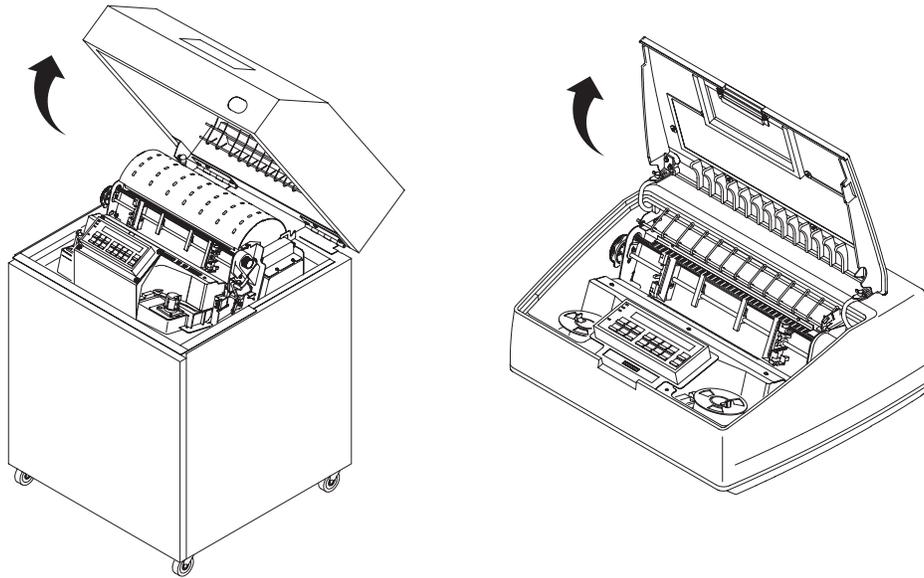
Figure 2–35. Opening the Printer Cover

1. Open the printer cover. See Figure 2–35.

Tractor Door

Forms
Thickness
Lever
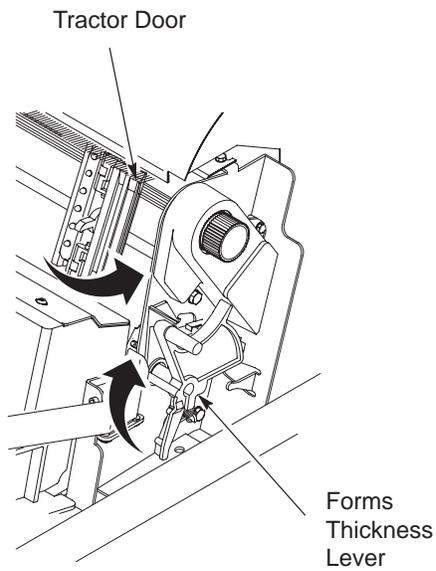
Figure 2–36. Forms Thickness Lever

2. Raise the forms thickness lever as far as it will go. See Figure 2–36.

3. Open the tractor doors. See Figure 2–36.
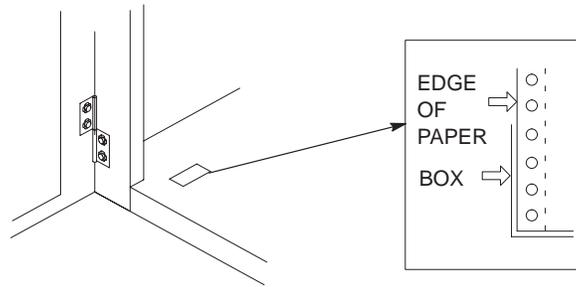
Figure 2–37. Paper Supply Label Location (Cabinet Models Only)

    4.   Prepare the paper supply:

- Cabinet models: Open the front door of the printer cabinet. Place the paper supply inside the printer, on the floor of the cabinet. Align the paper supply with the front label on the floor of the printer. Ensure that the paper pulls freely from the box. See Figure 2–37.

- Pedestal models: Place the paper supply on the floor in front of the printer, or on the optional paper shelf, if attached. Ensure that the paper pulls freely from the box.

Paper Slot is 8 inches below printer base
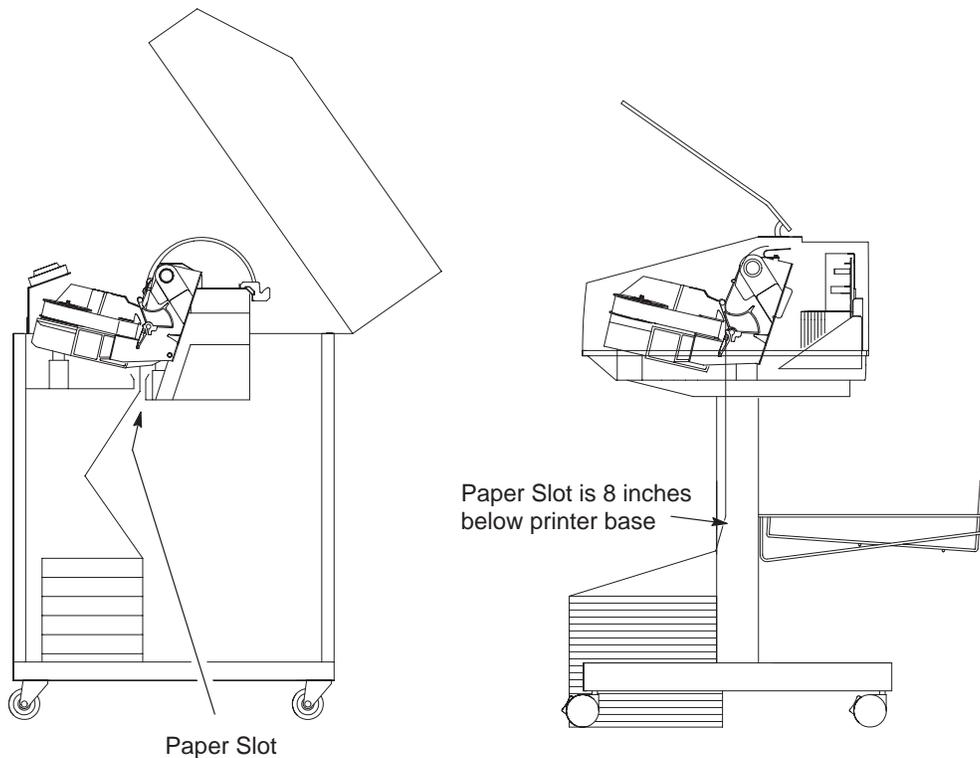
Paper Slot

Figure 2–38. Feeding the Paper

5. Feed the paper up through the paper slot. On pedestal models, be sure the paper feeds between the two wire guides. Hold the paper in place with one hand (to prevent it from slipping down through the paper slot) while pulling it through from above with your other hand. See Figure 2–38.

NOTE: For the pedestal model, this procedure shows loading paper when using the rear paper exit. For information on loading paper using the top paper exit, see the *Operator's Guide.*
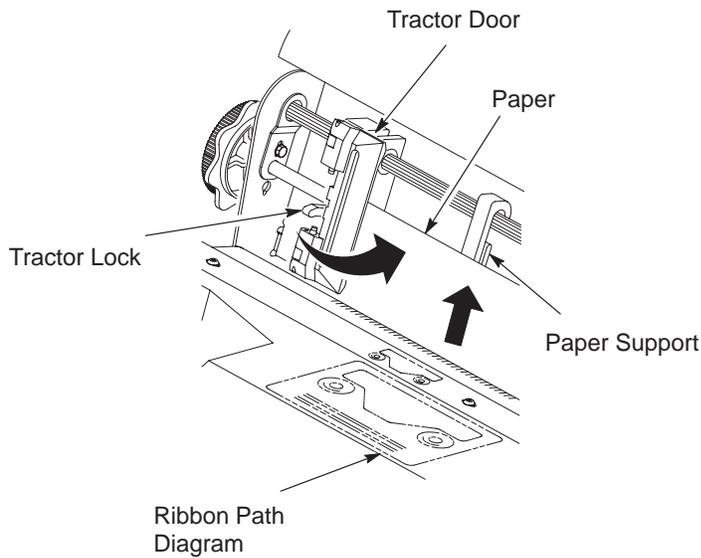
Figure 2–39. The Left Tractor

6. Pull the paper above and behind the ribbon mask, which is a silver-colored metal strip. Refer to the ribbon path diagram on the shuttle cover. Load the paper onto the left tractor sprockets and close the left tractor door. See Figure 2–39.
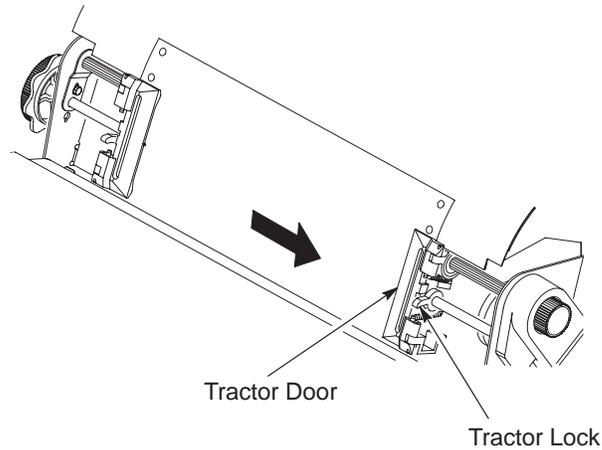
Figure 2–40. The Right Tractor

7. Load the paper onto the right tractor and close the right tractor door. Slide the right tractor horizontally to remove any paper slack, then lock it in place. See Figure 2–40.
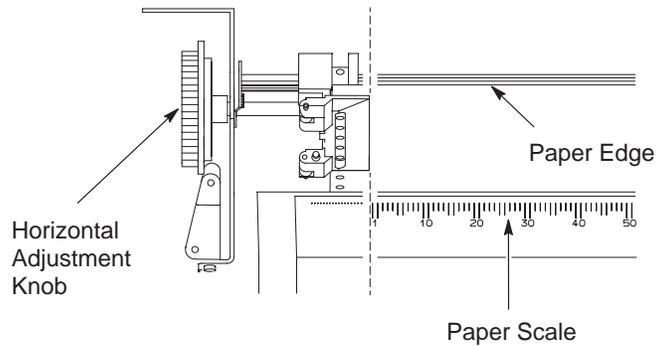
Figure 2–41. Aligning the Paper

8. Align the paper according to the paper scale on the shuttle cover by turning the horizontal adjustment knob. Turn the horizontal adjustment knob until the edge of the left tractor door is aligned with the number "1" on the paper scale. See Figure 2–41. You can also use this scale to count columns.

ATTENTION

To avoid damage to the printer caused by printing on the platen, always align the edge of the left tractor door with the number "1" on the paper scale.

A Thin Paper

B Medium Paper

C Thick Paper

Vertical Position Knob

NOTE:

Thin Paper = single sheet
Medium Paper = two–part form
Thick Paper = six–part form
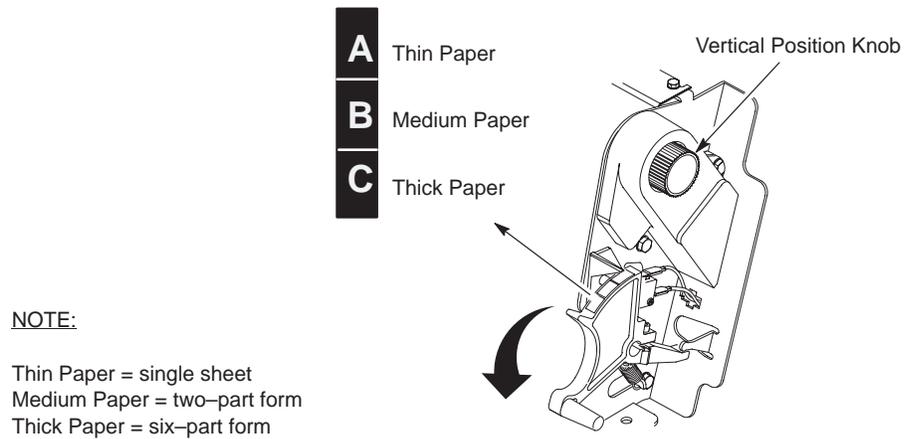
Figure 2–42. The Forms Thickness Scale

9. Turn the vertical position knob to feed the paper up into the paper guide assembly. See Figure 2–42.

10. Lower the forms thickness lever. Set it to match the paper thickness (refer to the note on shuttle cover). See Figure 2–42.

Power Paper Stacker Option

Overview

This section explains how to set up and use the optional power paper stacker. The power stacker mechanically directs the paper from the printer to the paper stack.

Power Paper Stacker Component Locations

Familiarize yourself with the names and locations of the components shown in the following illustration before operating the power paper stacker.
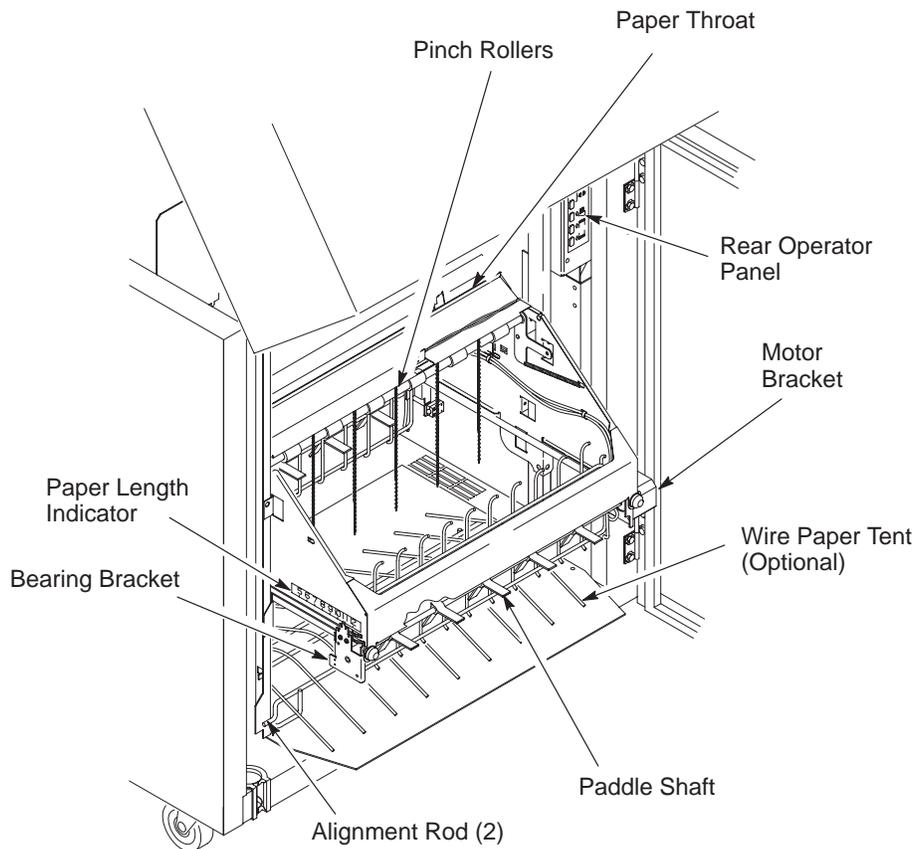
Figure 2–43. Power Paper Stacker Component Locations

Setting Up the Power Paper Stacker

1. Turn the printer on.
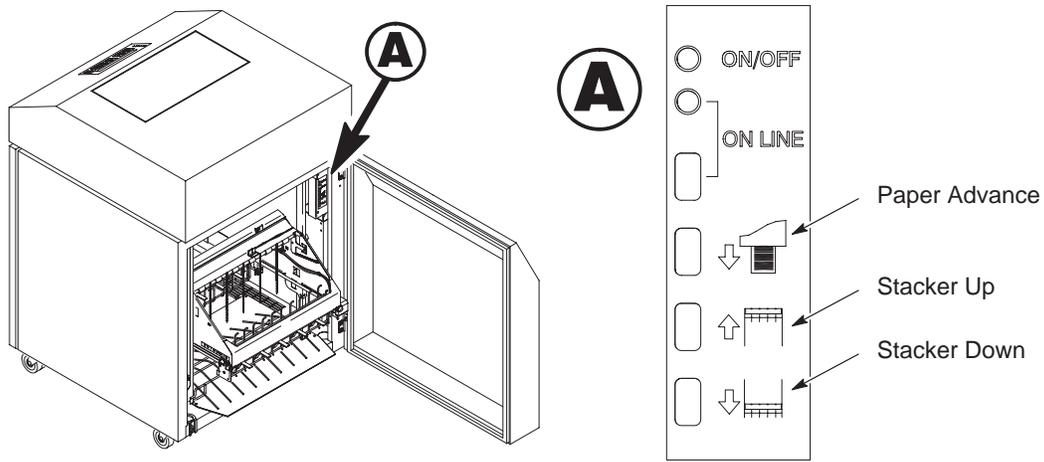
Figure 2–44. Rear Operator Panel

2. Using the rear operator panel, press ONLINE to take the printer offline. Press STACKER UP button and wait for the stacker to reach the top of its travel.
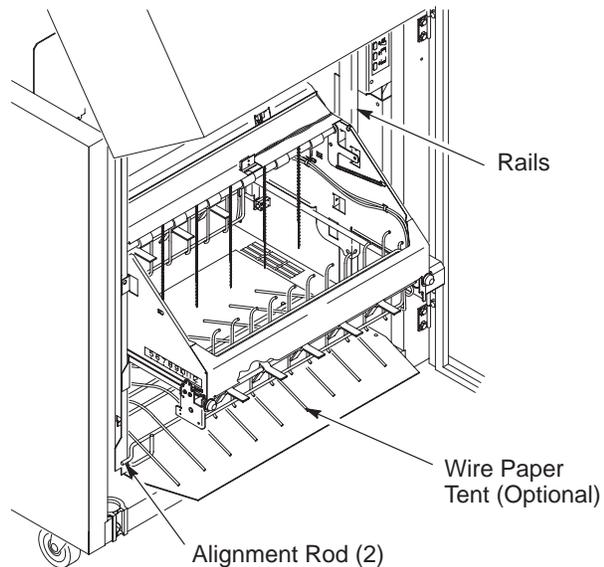
3. Make sure the wire paper tent, if provided, is in the base of the stacker with the alignment rods against the paper stacker rails.

Paddle Shaft

Bearing Bracket
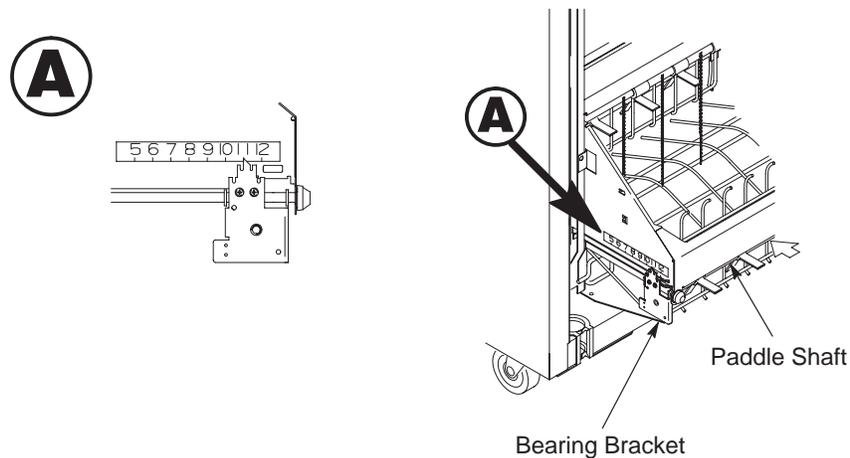
Figure 2–45. Setting Paper Length

4. Set the desired paper length (5–12 inch range), as follows:

Grasping the paddle shaft, push or pull toward the front or the rear of the printer, setting the desired paper length by aligning indicator notch on the bearing bracket with the paper length indicator.

5. Continue with the Loading and Starting the Power Stacker section.

Loading and Starting the Power Paper Stacker

1. Follow steps 1. through 10. in the Loading Paper section (see page 2–43).

2. Using the rear operator panel, press the PAPER ADVANCE key and hand feed the paper until paper reaches the wire tent and there is an excess of 3 to 5 pages. Be certain the paper passes through the paper stacker throat.

3. Stack the 3–5 sheets of paper on top of the wire paper tent, making sure the paper lies with the natural folds.

4. The printer displays, "OFFLINE." If a message other than "OFFLINE" displays, refer to the "Routine Service and Diagnostics" chapter.

5. Press the START key on the operator panel or the ONLINE key on the rear operator panel. "READY" displays on the LCD and the "ONLINE" on the rear operator panel is lit. The stacker frame returns to its proper position for printing.

6. Check to ensure paper is still centered between paper guides.

7. Close the rear cabinet door.

Checking the Paper Feed
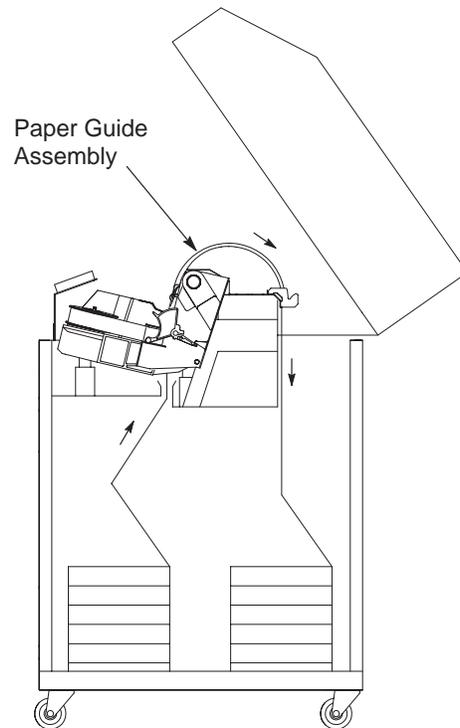
Figure 2–46. Checking the Paper Feed (Cabinet Models)

1. Cabinet models:

   Check that the paper feeds correctly. Press the **Form Feed** key several times to ensure that the paper feeds properly beyond the tractors and over the paper guide assembly. Ensure that the paper folds the same way in the stacking area as it does in the supply area. See Figure 2–46.
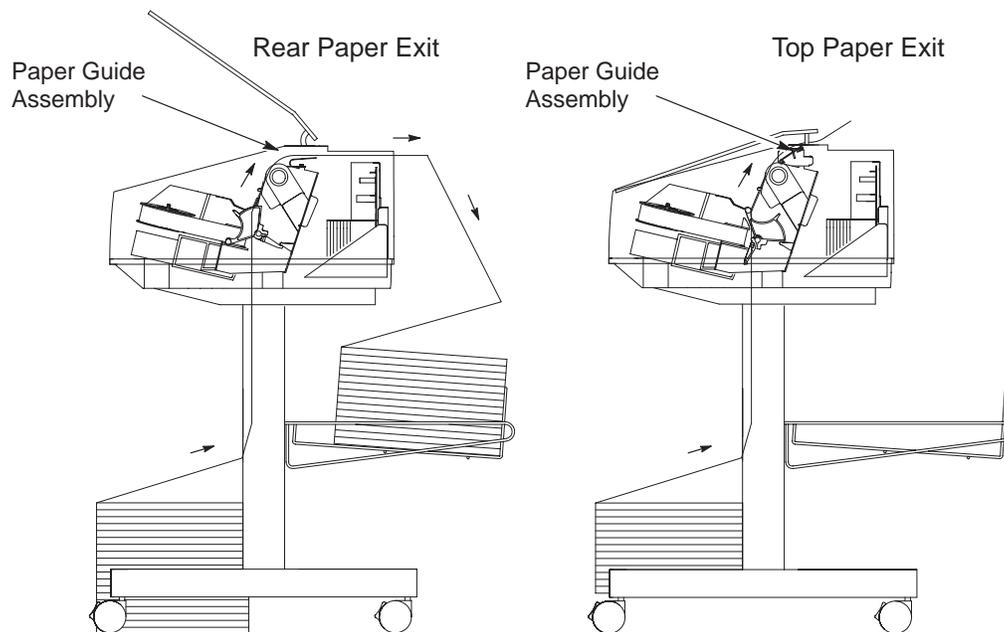
Figure 2–47. Checking the Paper Feed (Pedestal Models)

2. Pedestal models:

NOTE: See the *Operator's Guide* for instructions on switching between the two paper exit modes.

NOTE: When using the top exit paper path, paper can not be stacked. Paper is intended to be removed after each print job is completed.

- For rear paper exit: Press the **Form Feed** key several times to ensure that the paper feeds properly beyond the tractors, over the paper guide assembly, and through the paper exit slot in the rear of the cabinet. Ensure that the paper folds the same way in the stacking area as it does in the supply area. See Figure 2–47.

- For top paper exit: Press the **Form Feed** key several times to ensure that the paper feeds properly beyond the tractors, over the paper guide assembly, and through the paper exit slot. See Figure 2–47.

3. Cabinet models: Close the front and rear cabinet doors, if the length of the form allows.

4. Cabinet and pedestal models: Continue with the next procedure to set the top-of-form.

Set the Top-of-Form
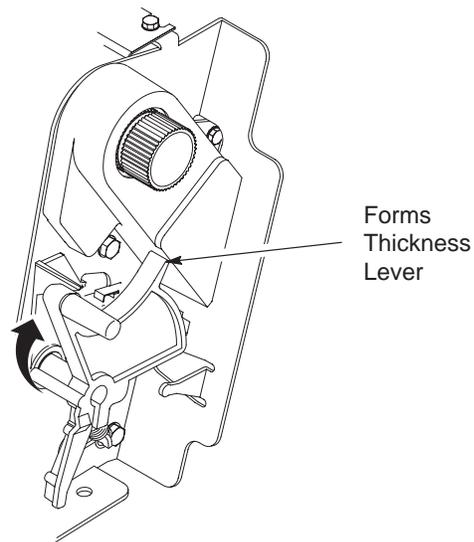
Figure 2–48. Raising the Forms Thickness Lever

1. Raise the forms thickness lever as far as it will go. The "CLOSE PLATEN" message will appear on the operator panel. Press any key on the operator panel to silence the alarm. See Figure 2–48.
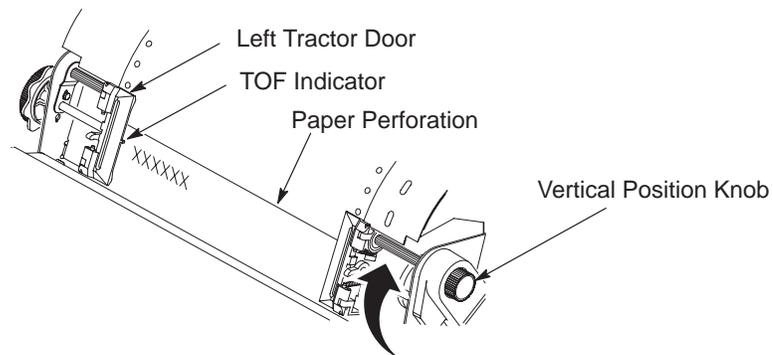
Figure 2–49. TOF Indicator

2. Locate the TOF indicator. It is the small tab located on the left tractor door. See Figure 2–49.

3. Turn the vertical position knob up or down to align the top of the first print line with the TOF indicator. See Figure 2–49.
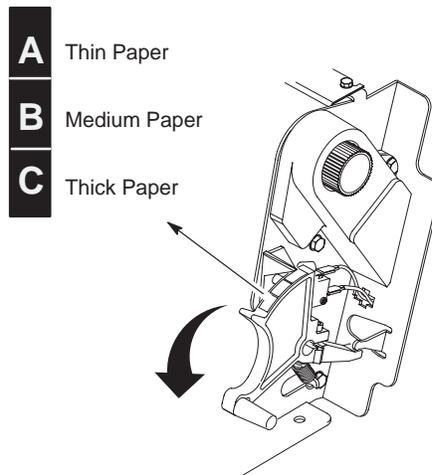
Figure 2–50. The Forms Thickness Scale

4. Lower the forms thickness lever. The CLOSE PLATEN fault clears automatically. Set it to match the paper thickness. If you are using single-part forms, set the forms thickness lever so that "A" is next to the indicator (refer to note on shuttle cover). See Figure 2–50.

NOTE: Do not set the forms thickness lever too tightly; excessive friction can cause paper jams and ribbon jams with potential for ribbon damage, smeared ink, or wavy print.

5. Press **Set Top of Form**. The paper moves downward to the top-of-form print position.

6. Continue with the next procedure to test the printer.

Test the Printer

To run an initial printer test, print the current configuration page. Go to Chapter 3, "Printing the Current Configuration," page 3–8, for instructions on printing the current configuration page.

On the configuration printout, examine the print quality of the characters. They should be fully formed and of uniform density. If text characters do not appear correctly formed or if the test does not run, contact your IBM service representative.

The printer is now ready for configuration. Refer to Chapter 3, "Configuring the Printer," for more information.

3 Configuring the Printer

Chapter Contents

Overview

IMPORTANT

Configuration directly affects printer operation. Do not try to change the configuration of your printer until you are thoroughly familiar with the procedures in this chapter.

In order to print data, the printer must respond correctly to signals and commands received from the host computer. Configuration is the process of matching the printer operating characteristics to those of the host computer and to specific tasks, such as printing labels, or printing on different sizes of paper. The characteristics that define the printer response to signals and commands received from the host computer are called configuration parameters.

You can configure the printer by pressing operator panel keys or by sending control codes from the host computer. This chapter explains how to use the operator panel to change individual parameters and save them as a custom configuration.

Operator panel keys are described in the *6400 Operator's Guide.*

Your programmer's reference manuals provide information about control codes.

The Configurations

A configuration consists of a group of parameters, such as line spacing, forms length, etc. Your printer contains the following configurations:

- Four preloaded configurations that have been customized for printer setup.

- The factory default configuration. It can be loaded, but it cannot be altered. A list of all the parameters and their values begins on page 3–10.

- Four configurations that you can customize for unique print job requirements. Page 3–18 explains how to create customized configurations.

Active versus Saved Configurations

When you change a parameter value, it is active as long as the printer is on or until it is changed again. This is true whether you use the operator panel or send a control code from the host. Parameter values defined by control codes override the active operator panel parameters when the printer is using any of the parallel or serial interfaces. For example, if you set the line spacing to 6 lpi with the operator panel, and application software later changes this to 8 lpi with a control code, the control code setting overrides the operator panel setting. When the printer is using either the coax or twinax interface, parameter values defined by control codes may or may not override panel parameters, depending on the setting of the OVERRIDE HOST option. See pages 4–26 and 4–35 for more information. The following parameters retain their operator panel setting if the Coax interface is enabled with override host option:

- Characters per inch (cpi)
- Lines per inch (lpi)
- Forms width
- Forms length

Using the operator panel, you can save the parameters as a customized configuration that is stored in non–volatile random access memory (NVRAM). A saved configuration is *not* lost when you power off the printer.

NOTE: Saved configurations are also referred to as "custom sets."

NOTE: For Coax/Twinax (including IPDS), when switching between coax or twinax, a soft reset is performed. The soft reset reloads the power up configuration values except for the emulation and interface values. All other configuration values are taken from the power on custom set, not the factory default custom set.

There are no control codes that allow you to save a parameter in NVRAM. However, you can save a configuration defined partially by control codes and store it in NVRAM using the operator panel. You can also save configuration values using PTR_SETUP. See page 4–15.

The Configuration Main Menu

Figure 3–1 shows an overview of the printer configuration menus. The pages that follow describe how to enter program mode, print the current configuration, change configuration parameters, and save and load custom sets.

For specific configuration menu options and their descriptions, refer to Chapter 4, "Configuration Menus."

NOTE: The menus that are displayed from the operator panel are determined by the installed features. For example, if you ordered the IPDS feature, then the IPDS menu would appear on the operator panel. If the IPDS feature is not installed, then the IPDS menu will not appear on the operator panel.

In this manual, the Coax and Twinax menus related to the Coax/Twinax feature are documented in Chapter 3, "Configuring the Printer," and Chapter 4, "Configuration Menus," because many customers order this feature at the factory. The operation of the Multi–Platform Interface Coax/Twinax feature is documented in the *Coax/Twinax Multi–Platform Interface Option Installation and Operation Guide.*

The menus for the IPDS, Code V, and IGP features are documented in Appendix E: "Code V, IGP, and IPDS Menus."

Each feature is shipped with a document that describes the feature in detail. For more information about these documents, see the "Related Documents" section that begins on page 1–3.

Printer Control Page 4–10	**Configuration Management** Page 4–17	**Twinax Interface** [1] Page 4–20	**Coax Interface** [1] Page 4–29	**Parallel Interface** Page 4–45
Interface Selection	Recall Custom Set	Print Language	Print Language	Interface Type
Display Language	Save Current Values	Print Character Table [4]	Print Character Table [4]	PC Parallel
Alarm Control	Delete Custom Set	Active Print Language	Active Print Language	Dataproducts
Print Direction	Change Power On Set	Printer Emulation	PA1	IEEE 1284
Hex Print Mode	Protect Custom Sets	Printer Address	PA2	Ethernet [3]
Power On State	Print Custom Set Values	World Trade	Buffer Reprint	Parallel Hotport
Paper Jam Detection		Cancel Buffers	Printer Emulation	
Forms Speed		Early Print Complete [2]	Early Print Complete	
Set Platen at Bottom of Form		Hex Transparent Control	Cancel Buffers	
Shuttle Timeout		Undefined Character Reporting	Hex Transparent Control	
Energy Saver Timer		Undefined Character Substitution	Mono/Dual Case	
OCR Font Density		Load Alternate Character Option	Undefined Character Substitution	
Eject/Restore		Print Text Direction	Print Text Direction	
PTR Setup Option		Override Host	Image Buffer Size	
File System		Format Control	Intervention Required	
Power Stacker [3]		Hex Print Mode [4]	Compatibility Options	
		C/T Hotport	Translate Table	
			Override Host	
			Format Control	
			C/T Hotport	
			Hex Print Mode [4]	

Serial Interface Page 4–53	**Emulation Configuration** Page 4–58	**Operator Print Tests** Page 4–90	**Printer Information** Page 4–92	**RibbonMinder** Page 7–3
Interface Type	IPDS [3]	Printer Demonstration	Installed Memory	New Ribbon
Data Protocol	Code V Emulation [3]	Print Error Log	Power On Time:	Ribbon Action
Baud Rate	IGP Emulation [3]	Ripple Print	Printing Time:	Ribbon Size
Data Bits	ASCII Printer Emulation	All E's	Print Strokes	Ribbon Adjust
Stop Bits	Printer Emulation Configuration	All H's	11 Inch Pages	Fault Action
Parity	Print Format	All E's + FF		
Data Terminal Ready		Underlines		
Request to Send		Ethernet Test Page		
Buffer Size in Kilobytes				
Poll Character				
One Char Enquiry				
Serial Hotport				

Notes:

[1] The Twinax and Coax interface menus only appear in the menus if the IBM Coax/Twinax feature is installed. If the Multi–Platform Interface Coax/Twinax feature is installed the Twinax and Coax Interface menus are not displayed because the Multi–Platform Interface feature does not use these menus.

[2] The Early Print Complete option appears in the Twinax menu only if the IPDS feature is installed.

[3] Options appear in the menus only if these features are installed. Menus are shown in Appendix E.

[4] Not available in IPDS.

To view options, press:

Scroll ↑   Scroll ↓   **Enter**   Return

Enter

To select an option, press:

To exit the configuration menus and return to READY, press: Start

* = Factory Default

Figure 3–1. Configuration Main Menu

Using the Operator Panel

Figure 3–2. The Operator Panel

The operator panel is shown above. During the configuration process, you will use the **Scroll↑**, **Scroll↓**, **Enter**, and **Return** keys on the operator panel to access configuration settings and diagnostic tests via the configuration menus. As you access menus and options, menu names and option values appear on the operator panel message display (sometimes referred to as LCD, or Liquid Crystal Display).

This chapter provides numerous examples of how to use the operator panel keys and indicator message display to configure the printer. The operator panel key functions are described in detail in your *6400 Operator's Guide*.

Program Mode

The printer is in Program mode whenever the configuration menus and option values are displayed on the operator panel message display. Program mode is either locked or unlocked. In order to select new configuration values, you must unlock Program mode. In order to prevent accidental changing of the configuration settings, you may lock Program mode.

Unlocking the Program Mode

Program mode must be unlocked in order to use the operator panel to change the configuration settings. When Program mode is unlocked, pressing the **Enter** key selects configuration values as the active values, that is, places them into printer NVRAM. An asterisk (*****) after a displayed setting shows it is entered into memory.

Press the **Scroll↑** + **Scroll↓** keys at the same time to unlock Program mode. The following message will appear briefly:

```
OPERATOR MENU
UNLOCKED
```

Locking the Program Mode

When Program mode is locked, you cannot use the operator panel to change the configuration settings. However, you can still select the configuration menus and view the current configuration settings.

Press the **Scroll↑** + **Scroll↓** keys at the same time to lock Program mode. The following message will appear briefly:

```
OPERATOR MENU
LOCKED
```

Entering Program Mode

To place the printer in Program mode, press the **Menu** key.

Printing the Current Configuration

Before you begin changing parameter values for the printer, you may wish to print out a record of the current configuration, including any active values that you have recently modified. If you have not changed any parameter settings, the current configuration is the factory default configuration.

There are two methods for printing the current configuration: the first method is to press the Printer Configuration key, as shown in the following procedure.

Step	Key	Result	Notes
1.	Make sure the printer is on.		
2.	Press: Stop	NOT READY	The printer must be in NOT READY mode to print the configuration.
3.	Printer Con-figuration	PRESS START TO PRINT PRESS STOP TO EXIT	You are prompted to press the **Start** key before the configuration prints.
4.	Start	NOT READY	Indicates that the configuration has printed. Date and store the printout in a safe place. You may also want to label the printout (e.g. "Configuration for 2-up Labels").
5.	Start	READY	The printer is READY for normal operation.
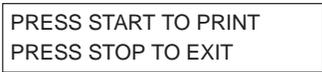
The second method for printing the current configuration, as well as several other configurations, is to use the Print Custom Set Values menu option, shown on the following page.

```
┌─────────────────┐
│ CONFIGURATION   │
│ MANAGEMENT      │
└─────────────────┘
        │
  ┌─────┴─────┬───────────┬───────────┬───────────┬───────────┐
┌─┴──────┐ ┌──┴──────┐ ┌──┴──────┐ ┌──┴──────┐ ┌──┴──────┐ ┌──┴──────┐
│ Recall │ │ Save    │ │ Delete  │ │ Change  │ │ Protect │ │ Print   │
│ Custom │ │ Current │ │ Custom  │ │ Power   │ │ Custom  │ │ Custom  │
│ Set    │ │ Values  │ │ Set     │ │ On Set  │ │ Sets    │ │ Set     │
└────────┘ └─────────┘ └─────────┘ └─────────┘ └─────────┘ │ Values  │
    │          │           │           │           │       └─────────┘
                                                                 │
```

Current Custom Set*
Factory Default
Power On Custom Set
All Custom Sets
Custom Set 1
Custom Set 2
Custom Set 3
Custom Set 4
Custom/Preloaded Set 5
Custom/Preloaded Set 6
Custom/Preloaded Set 7
Custom/Preloaded Set 8

* = Factory Default
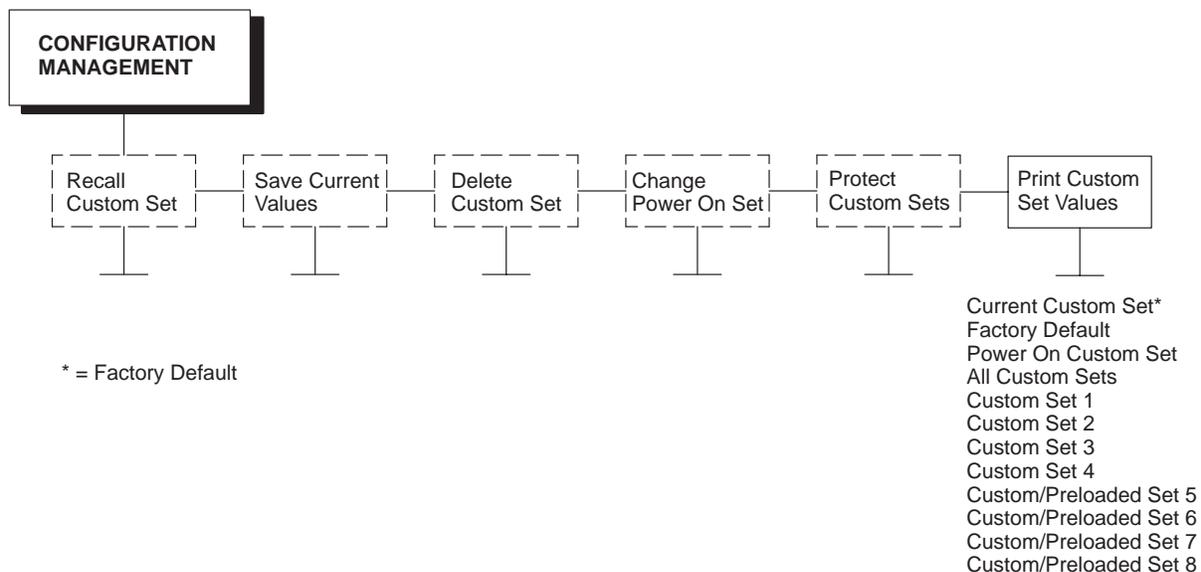
The Print Custom Set Values selection on the Configuration Management menu allows you to print any or all of the configurations shown above. The default setting, "Current Custom Set," will print the same information as pressing the Printer Configuration key. The Current Custom Set is the Power On configuration until you begin modifying the printer configuration.

Custom sets 1 through 4 do not exist until you save configuration parameters to them. You must define and save a custom set before you can print it.

Custom/Preloaded Sets 5–8 contain configuration sets that assist with the installation and configuration of this printer.

The other options will only be useful once you have modified and saved the printer configuration parameter settings.

The Power On Custom Set is defined by the "Change Power On Set" option.

Custom Sets 1 through 8 are defined by the "Save Current Values" option.

These options are described in detail under the Configuration Management Menu description starting on page 4–18.

Factory Default Configuration Values

The factory default values are permanently stored as a configuration. They cannot be modified or erased. The parameters which display depend on which interface and emulation is installed. The default values for optional features (IPDS, IGP and Code V) are provided in Appendix E.

Below is a representative factory default configuration based on the twinax interface. Your factory default configuration will depend on the features installed in your printer.

```
POWER ON CURRENT CONFIGURATION – FACTORY CONFIGURATION
IBM Printer Configuration
Reference Number 351939
File Part Number XXXXXXX Date 17–Nov–1997
Base Coax/Twinax Version 2.04D
Base Line Printer+ Version 2.01C
DC              V2.04D 17–Nov–97 #351608
EC              V2.01D 13–Nov–97 #351594
BOOT/CMX        V1.04D 28–Oct–97 #351553
SHUTTLE TYPE              1400
FLASH                    2 MB
DRAM                     6 MB
SECURITY PAL             154140–017
ETHERNET VERSION     VER=6.9.9.29 MOS=1.1.6
CONFIGURATION CODE      FC04FF

PRINTER CONTROL
    Interface Selection                         Twinax
    Display Language                            English
    Alarm Control                               Alarm Enabled
    Print Direction                             Bidirectional
    Hex Print Mode                              Disable
    Power On State                              Ready
    Paper Jam Detection                         Enable
    Forms Speed                                 Normal Speed
    Set Platen at Bottom of Form                Disable
    Shuttle Timeout                             5 Seconds
    Energy Saver Timer                          15 Minutes
    OCR Font Density                            120 Dots per inch
    Eject/Restore                               Standard [5]
    PTR Setup Option
        Setup Parse                             Disable
        Setup SFCC                              21h
    File System
        Overwrite Files                         Enable
        View File List
            Version                             69 Bytes
        Optimize&Reboot
        Print File List
```

CONFIGURATION MANAGEMENT
    Recall Custom Set   Factory Default
    Save Current Values   Custom Set 1
    Delete Custom Set   Custom Set 1
    Change Power On Set   Factory Default
    Protect Custom Sets   Disable
    Print Custom Set Values   Current Custom Set
ETHERNET PARAMETERS [10]
    Buffer Size in Kilobytes   16
    IPO Address   192.168.022.013
    Gateway Address   192.168.022.001
    Subnet Mask   255.255.255.000
    MAC Address   00807203087A
    Novell Protocol   Enable
    NetBIOS Protocol   Enable
    Novell Frame   Ethernet 802.2
    Printer Manager Port Number   3001
    Printer Manager Port Timeout   32 Seconds
    Ethernet Hotport
        Trickle Time   1/4 Sec.
        Timeout   10 Sec.
        Report Status   Disable
TWINAX INTERFACE [1]
    Print Language
        Standard Print Language   0037 English (USA/Canada)
        Alternate Print Language   English US
    Print Character Table [9]
    Active Print Language   Standard Print Language
    Printer Emulation   4234–2
    Printer Address   Address 1
    World Trade   Standard Character Set
    Cancel Buffers   Enable
    Early Print Complete   Disable [6]
    Hex Transparent Control
        Lead–in Characters   Set 1 <%>
        Alternate Set 80–9F   Printable
    Undefined Character Reporting   Enable
    Undefined Character Substitution   60
    Load Alternate Character Option   Enable
    Print Text Direction   Control By Host
    Override Host   Disable
    Format Control   Disable
    Hex Print Mode [9]   Disable
    C/T Hotport
        Port Type   Twinax
        Timeout   15 Sec.
        Report Status   Disable
COAX INTERFACE [1]
    Print Language
        Standard Print Language   0037 English (USA/Canada)
        Alternate Print Language   English US

Print Character Table [9]
Active Print Language   Standard Print Language
PA1
PA2
Buffer Reprint
Printer Emulation   4234
Early Print Complete   Disable
Cancel Buffers   Enable
Hex Transparent Control
  Lead–in Characters   Set 1 <%>
  Alternate Set 80–9F   Printable
Mono/Dual Case   Dual Case
Undefined Character Substitution   60
Print Text Direction   Control By Host
Image Buffer Size   4K
Intervention Required   Send to Host
Compatibility Options
  Compatibility Option 1   Off
  Compatibility Option 2   Off
  Compatibility Option 3   On
  Compatibility Option 4   Off
  Compatibility Option 5   Off
  Compatibility Option 6   On
  Compatibility Option 7   Off
  Compatibility Option 8   Off
  Compatibility Option 9   On
  Compatibility Option 10   Off
Translate Table   Default
Override Host   Disable
Format Control   Disable
C/T Hotport
  Port Type   Twinax
  Timeout   15 Sec.
  Report Status   Disable
Hex Print Mode [9]   Disable
PARALLEL INTERFACE
  Interface Type   PC Parallel
  PC Parallel
    Data Bit 8   Enable
    Data Polarity   Standard
    Strobe Polarity   Standard
    Response Polarity   Standard
    Busy on Strobe   Enable
    Latch Data On   Leading Edge
    Prime Signal   Enable
    TOF Action at Prime Signal Form Feed at Reset
    Buffer Size in Kilobytes   16
  Dataproducts
    Data Bit 8   Enable
    PI Ignored   Enable
    Data Polarity   Standard
    Data Request Polarity   Standard

Strobe Polarity	Standard
IEEE 1284	
Parallel Hotport	
Trickle Time	1/4 Sec
Timeout	10 Sec.
Report Status	Disable
SERIAL INTERFACE	
Interface Type	RS 232
Data Protocol	XON/XOFF
Baud Rate	9600 Baud
Data Bits	8
Stop Bits	1
Parity	None
Data Terminal Ready	READY and Buffer Not Full
Request to Send	True
Buffer Size in Kilobytes	16
Poll Character	00 Hex
One Char Enquiry	Disable
Serial Hotport	
Trickle Time	1/4 Sec
Timeout	10 Sec.
Report Status	Disable
EMULATION CONFIGURATION	
IPDS [2]	
Override Host	Disable
Graphics Quality	Medium
Bar Code Quality	High
Image Quality	Low
IPDS Emulation Mode	4234
Postnet Barcode Width	Standard
UPC/EAN Barcode HRI	On
Enhanced Barcode Mode	Disable
Compressed Font	Disable
Code V Emulation [2]	
SFCC and Power On	
Select SFCC	5E
Power on ^X	Disable
Power on ^F	Disable
Power on ^PY	Disable
Lines Per Inch	6
Graphics Options	
Slashed Zero	Disable
Ignore Dots Value	Disable
Append Rotated	Disable
Truncate Off Page Alpha	Enable
True Vert 1/10	Disable
Absorb at ^PY	Absorb Motion
UPC Descenders	Enable
Rotate Character Size	Adjusted
Ignore Spaces	Disable
Midline PY	Disable
Dark Barcode	Disable

Expanded Font	Block
Width Limit	Disable
IGP110 Compatibility	Enable
Error Handling	
Error Messages	Enable
Error Markers	Enable
Off Page Errors	Disable
Bar Code Errors	Enable
Character Filtering	
Ignore Characters	Disable
Select Character 1	0
Select Character 2	0
Data Bit 8	Enable
Font Set	0
PI Control	
Printer PI	Disable
Host PI	Disable
PI Slew Range	Enable
Active Graphic Emulation	Code V
	IGP
IGP Emulation [2]	
Define CR Code	CR = CR
Define LF Code	LF = LF
Auto LF	Disable
Select SFCC	7E
PI Slew Range	16
CR Edit	Disable
Select Font	0
Lines Per Inch	6 lines per inch
Mono/Dual Case	Dual case
Skip command prefix	Enable
Power on IGP	Enable
EXT Execute Copy	Disable
UPC Descenders	Enable
Compressed 17 CPI	Disable
Ignore Character	
Ignore Mode	Disable
Select Character	0
IGP100 Compatibility	Enable
Expanded Font	Block
Optimized Ratio	Disable
ASCII Printer Emulation	Proprinter III XL Emulation
	P–Series Emulation [3]
Printer Emulation Configuration	
Proprinter III XL Emulation	
Print Language	0437 PC Character Set
Alternate Character Set	PC Character Set 1
Define CR Code	CR = CR
Auto LF	Enable
Define LF Code	LF = LF
FF Valid at TOF	Enable
20 CPI Condensed	Enable

Epson Emulation
 Character Sets   Epson Set
 Epson Print Language   ASCII (USA)
 Define CR Code   CR = CR
 Auto LF   Enable
 Define LF Code   LF = LF
 Printer Select   Disable
 20 CPI Condensed   Enable
P–Series Emulation
 Character Sets   IBM PC
 Print Language
  IBM PC
   Select Subset Primary ASCII (USA)
   Select Subset Extended 0437 PC Character Set
  Multinational   ASCII (USA)
  ECMA Latin 1
   Select Subset Primary ASCII (USA)
   Select Subset Extended Multinational
  DEC Multinational   ASCII (USA)
 Control Code 6   8.0 LPI
 Control Code 8   Elongated
 Define CR Code   CR = CR
 Auto LF   Disable
 Overstrike   Enable
 Define LF Code   LF = CR + LF
 Select SFCC   1
 EVFU Select   Enable
 Alternate Set 80–9F   Control Code
P Series XQ Emulation
 Control Code 6   8.0 LPI
 Define CR Code   CR = CR
 Auto LF   Disable
 Define LF Code   LF = CR + LF
 Compressed Print   Char 01 SOH
 Elong/Alt. Font   Elng=BS Font=SO
 High Speed Print Mode Char 02 STX
 EVFU Select   Enable
 Upper Case Select   Disable
 Slew Relative   1 to 16 lines
Serial Matrix Emulation
 Character Sets   IBM PC
 Print Language
  IBM PC
   Select Subset Primary ASCII (USA)
   Select Subset Extended 0437 PC Character Set
  Multinational   ASCII (USA)
  ECMA Latin 1
   Select Subset Primary ASCII (USA)
   Select Subset Extended Multinational
  DEC Multinational   ASCII (USA)
 Control Code 06   8.0 LPI

Define CR Code	CR = CR
Auto LF	Enable
Overstrike	Enable
Define LF Code	LF = LF
Printer Select	Disable
Alternate Set 80–9F	Control Code
Print Format [7]	
Characters Per Inch	10.0 Characters Per Inch
Lines Per Inch	6.0 Lines Per Inch
Forms Width [7]	
Forms Width in inches	13.6 inches
	13.2 inches [4]
Forms Width in MM	345.4 MM
	335.3 MM [4]
Forms Width in Characters	136 Characters
	132 Characters [4]
Forms Length [7]	
Forms Length in inches	11.0 inches
Forms Length in mm	279.4 mm
Forms Length in lines	66 lines
Print Quality	DP Quality
Print Character Table	
Print Attributes [9]	
Proportional Spacing	Disable
Italic Print	Disable
Slashed Zero	Disable
Text Position	Bottom of Line
Margins [8, 9]	
Left Margin	0 Characters
Right Margin	0 Characters
Bottom Margin	0 Lines
Perforation Skip	Disable
Reset Command	Load Factory
OPERATOR PRINT TESTS	Printer Demonstration
Printer Information	
Installed Memory	8 MB
Power On Time:	XXX.X Hours
Printing Time:	XX Hours
Print Strokes	XXXXXXX
11 Inch Pages	XXXX
RibbonMinder	
New Ribbon	
Ribbon Action	Disable
Ribbon Size	100 Yards
Ribbon Adjust	0
Fault Action	New Ribbon

<u>Notes</u>:

(1)   Twinax and Coax Interface only appear in the menus if these features are installed. Menus are shown in Chapter 4. If the Multi–Platform Interface Coax/Twinax feature is installed the Twinax and Coax Interface menus are not displayed because the Multi–Platform Interface Coax/Twinax feature does not use these menus.

(2)   IPDS, IGP and Code V Emulations only appear in the menus if these features are installed. Menus are shown in Appendix E.

(3)   P–Series Emulation should be selected as the ASCII Printer Emulation when Code V and IGP emulation features are installed.

(4)   Default forms width values when P–Series, Coax/Twinax, IGP, Code V, or IPDS are installed.

(5)   Cabinet and Pedestal Models.

(6)   IPDS only.

(7)   For Coax/Twinax and IPDS, forms width is measured in characters and forms length is measured in lines.

(8)   For Coax/Twinax, bottom margin is available.

(9)   For Non–IPDS only.

(10)   For Ethernet Interface only.

Changing Parameters

```
┌─────────────────────┐
│ PRINTER CONTROL     │
└─────────────────────┘
```

┌──────────┐ ┌──────────┐ ┌──────────┐ ┌──────────┐ ┌──────────┐
│Interface │ │Display   │ │Alarm   │ │Print   │ │Hex Print │   . . .
│Selection │ │Language │ │Control   │ │Direction │ │Mode   │
└──────────┘ └──────────┘ └──────────┘ └──────────┘ └──────────┘

Bidirectional*
Unidirectional
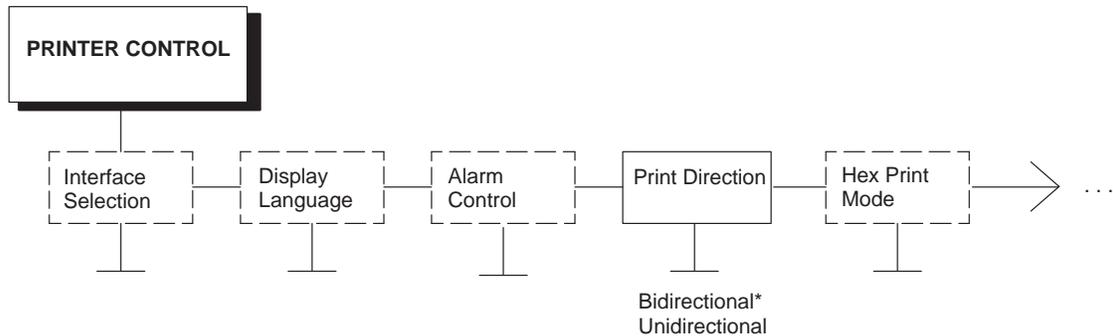
* = Factory Default

The following procedure shows you how to change a configuration setting.
Changing the Print Direction from the factory default setting
BIDIRECTIONAL to the setting UNIDIRECTIONAL is provided as an
example. Print Direction is one of the Printer Control menu options. The
procedure is similar for other configuration changes. Use these basic
guidelines to navigate the configuration menus and change other parameters.

NOTE: You can press **Start** at any time to exit the configuration menu.

Step	Key	Result	Notes
1.	Determine which parameters you want to change, and what their new values should be. (In this example, we are changing the value of the PRINT DIRECTION parameter from "BIDIRECTIONAL" to "UNIDIRECTIONAL.")		
2.	Press: Stop	NOT READY	Places the printer in NOT READY mode before entering the operator menus.
3.	Scroll ↑ + Scroll ↓	OPERATOR MENU UNLOCKED	Unlocks the Operator Menu, which allows you to make configuration changes.
4.	Menu	OPERATOR MENU PRINTER CONTROL	Displays the first Configuration Main Menu option, PRINTER CONTROL.
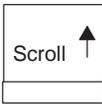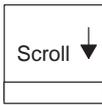
Step	Key	Result	Notes
5.	Enter	PRINTER CONTROL INTERFACE SELECTION	Moves into the PRINTER CONTROL menu.
6.	Scroll ↑ UNTIL	PRINTER CONTROL PRINT DIRECTION	Moves to the PRINT DIRECTION parameter.
7.	Enter	PRINT DIRECTION BIDIRECTIONAL*	Moves into the PRINT DIRECTION menu. The asterisk (*) shows that this is the active value.
8.	Scroll ↑	PRINT DIRECTION UNIDIRECTIONAL	Moves to the next available option, the UNIDIRECTIONAL option.
9.	Enter	PRINT DIRECTION UNIDIRECTIONAL*	Selects the displayed value. An asterisk (*) appears, indicating that this choice is now the active value.
10.	Continue this pattern to make other changes, using the information in this chapter.		
11.	The configuration you have selected is now the "active" value until you power off the printer. To save changes so that they will remain when the printer is reset or powered back on, see "Saving Your Configuration in a Custom Set" on page 3–20. If you want to use—but not save—these settings, continue to the next step.		
12.	Stop	NOT READY	Returns the printer to the NOT READY mode.
13.	Scroll ↑ + Scroll ↓	OPERATOR MENU LOCKED	Relocks Program mode and the Operator Menu.
14.	Start	READY	Places the printer in READY mode, prepared for normal operation.
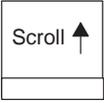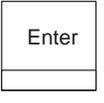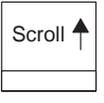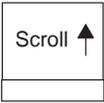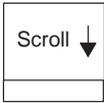
Saving Your Configuration in a Custom Set

```
┌─────────────────┐
│ CONFIGURATION   │
│ MANAGEMENT      │
└─────────────────┘
        │
  ┌─────┴──────┬────────────┬────────────┬────────────┬────────────┐
  │            │            │            │            │            │
┌─────────┐ ┌──────────┐ ┌──────────┐ ┌──────────┐ ┌──────────┐ ┌───────────┐
│Recall   │ │Save Current│ │Delete   │ │Change    │ │Protect   │ │Print Custom│
│Custom Set│ │Values    │ │Custom Set│ │Power On Set│ │Custom Sets│ │Set Values │
└─────────┘ └──────────┘ └──────────┘ └──────────┘ └──────────┘ └───────────┘
     │           │            │            │            │             │
                1*
                2
                3
                4
                5
                6
                7
                8
```
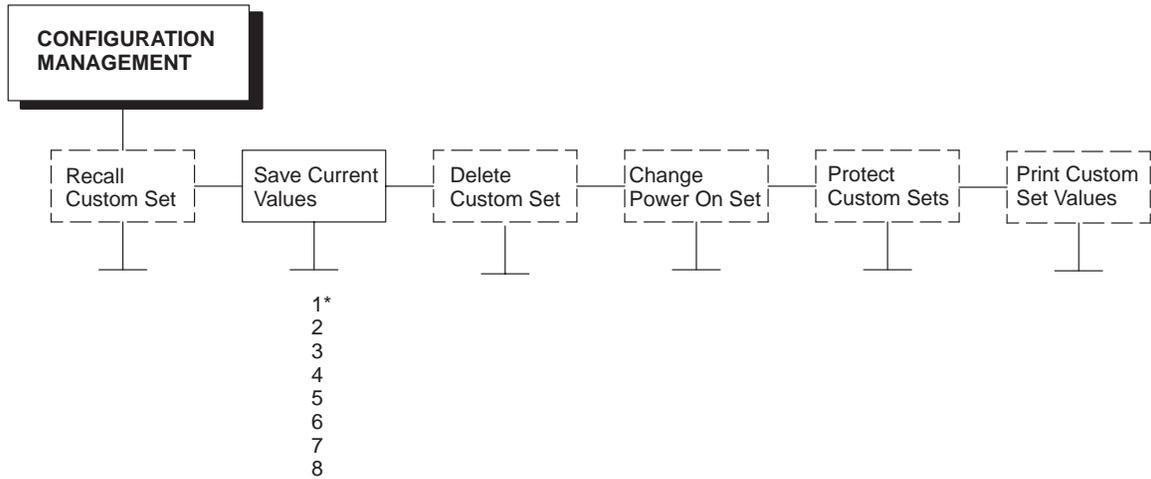
* = Factory Default

Once you have changed all of the necessary parameters, it is recommended
you save them as a configuration that can be stored and loaded later for
future use. You can save your configurations to meet different print job
requirements.

The saved configurations (called custom sets) are stored in NVRAM—they
will not be lost if you power off the printer.

Later, you can load one of the configurations for a specific print job. This
eliminates the need to change settings (CPI, LPI, etc.) for each new job. See
page 3–23 about loading configurations.

You may want to print records of your configurations (page 3–8) and store
them in a safe place, such as inside the printer cabinet.

If you do not save your configuration before you power off the printer, all of
the new parameter values that have not been saved to NVRAM will be
erased. When you power the printer on again, the power-on configuration
will load. If no configuration has been designated as the power-on
configuration, the factory configuration will load.

NOTE: To avoid overwriting an existing custom set, the Protect Custom
Sets parameter must be set to ENABLE. See page 4–19 for details.

Step	Key	Result	Notes
1. Press:	Stop	NOT READY	Places the printer in NOT READY mode.
2.	Scroll ↑ + Scroll ↓	OPERATOR MENU UNLOCKED	Unlocks the Operator Menu, which allows you to save configuration changes.
3.	Menu	OPERATOR MENU PRINTER CONTROL	Displays the PRINTER CONTROL option on the Configuration Main Menu.
4.	Scroll ↑ UNTIL	OPERATOR MENU CONFIGURATION MANAGEMENT	Moves to the Configuration Management menu option.
5.	Enter	CONFIGURATION MANAGEMENT RECALL CUSTOM SET	Selects the CONFIGURATION MANAGEMENT menu. The RECALL CUSTOM SET option appears.
6.	Scroll ↑ UNTIL	CONFIGURATION MANAGEMENT SAVE CURRENT VALUES	Moves to the SAVE CURRENT VALUES option.
7.	Enter	SAVE CURRENT VALUES 1*	Selects the SAVE CURRENT VALUES menu.
8.	Scroll ↑ UNTIL	SAVE CURRENT VALUES 2	Scrolls through list of custom sets 1–8.
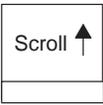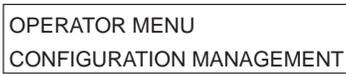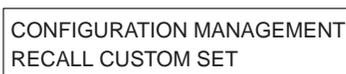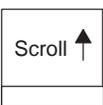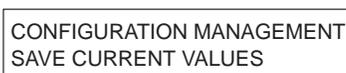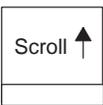
Step	Key	Result	Notes
9.	Enter	SAVING CONFIGURATION	Selects the SAVE CURRENT VALUES option. The message "SAVING CONFIGURATION" appears briefly.
10.	Stop	NOT READY	Returns the printer to the NOT READY mode.
11.	Scroll ↑ + Scroll ↓	OPERATOR MENU LOCKED	Relocks Program mode and the Operator Menu.
12.	Start	READY	Places the printer in READY mode, prepared for normal operation.
13.	It is recommended you make a printout of your current configuration, as described on page 3–8.		
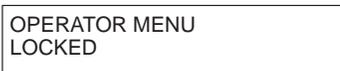
Loading Custom Sets or Factory Default Values

```
CONFIGURATION
MANAGEMENT
```

| Recall Custom Set | Save Current Values | Delete Custom Set | Change Power On Set | Protect Custom Sets | Print Custom Set Values |

Factory Default*
Custom Set 1
Custom Set 2
Custom Set 3
Custom Set 4
Custom/Preloaded Set 5
Custom/Preloaded Set 6
Custom/Preloaded Set 7
Custom/Preloaded Set 8
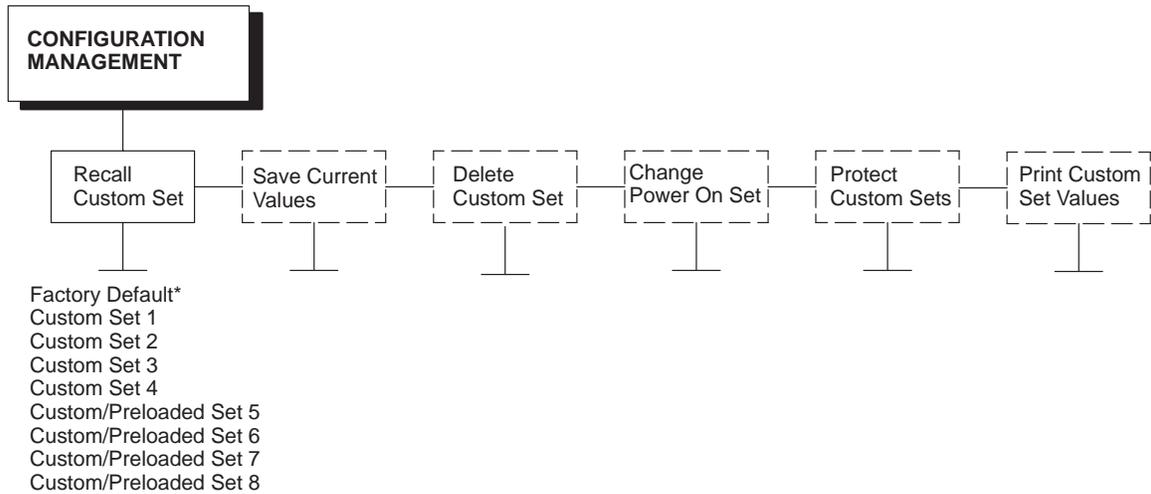
* = Factory Default

You can load any of the custom set configurations or the factory default configuration. (Factory default parameters are shown starting on page 3–10.) The loaded configuration remains active as long as the printer is on. The following procedure shows how to load factory defaults to the printer.

If you power off the printer, the power-on configuration will load the next time the printer is powered on. Page 3–25 explains how to select the power-on configuration.

Step	Key	Result	Notes
1. Press:	Stop	NOT READY	Places the printer in NOT READY mode.
2.	Scroll ↑ + Scroll ↓	OPERATOR MENU UNLOCKED	Unlocks the Operator Menu, which allows you to load a configuration.
3.	Menu	OPERATOR MENU PRINTER CONTROL	Displays the first Configuration Main Menu option, PRINTER CONTROL.

Step	Key	Result	Notes
4.	Scroll ↑ UNTIL	OPERATOR MENU CONFIGURATION MANAGEMENT	Moves from the Configuration Main Menu option to the CONFIGURATION MANAGEMENT menu.
5.	Enter	CONFIGURATION MANAGEMENT RECALL CUSTOM SET	Moves to the RECALL CUSTOM SET option.
6.	Enter	RECALL CUSTOM SET FACTORY DEFAULT	Moves forward to the FACTORY DEFAULT parameter for the RECALL CUSTOM SET option.
7.	Enter	LOADING SAVED CONFIGURATION	Loads the set of Factory Default values. The message "LOADING SAVED CONFIGURATION" appears briefly.
8.	Stop	NOT READY	Returns the printer to NOT READY mode.
9.	Scroll ↑ + Scroll ↓	OPERATOR MENU LOCKED	Locks Program mode and the Operator Menu.
10.	Start	READY	Places the printer in READY mode, with the Factory Default values loaded.
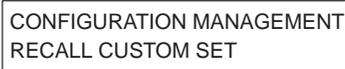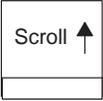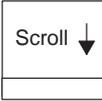
Changing the Power On Configuration

CONFIGURATION MANAGEMENT

| Recall Custom Set | Save Current Values | Delete Custom Set | Change Power On Set | Protect Custom Sets | Print Custom Set Values |

Factory Default*
Custom Set 1
Custom Set 2
Custom Set 3
Custom Set 4
Custom/Preloaded Set 5
Custom/Preloaded Set 6
Custom/Preloaded Set 7
Custom/Preloaded Set 8
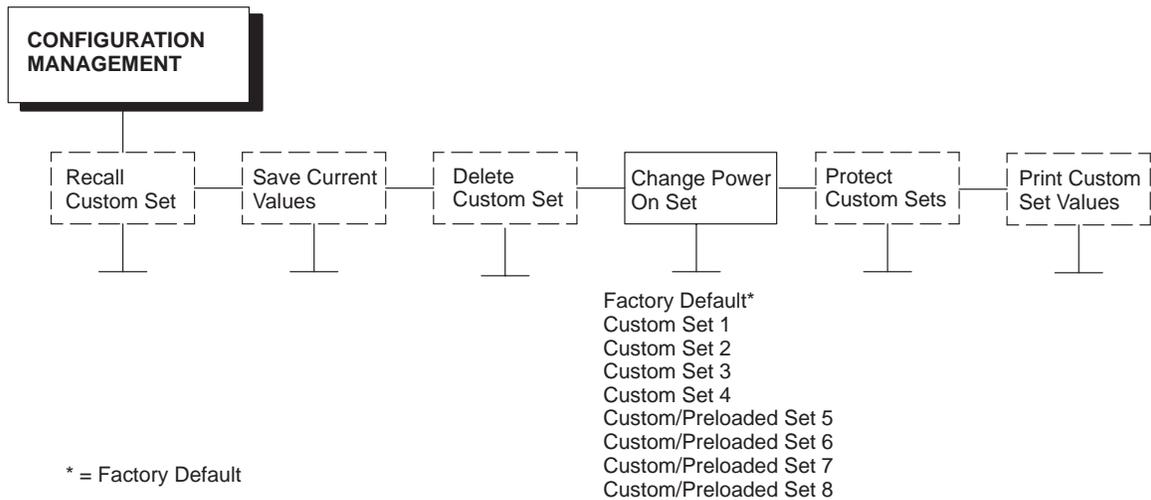
* = Factory Default

When you power on the printer for the first time, it loads the factory default configuration. If you power the printer off and then back on, the printer will load the designated power-on configuration (which is set to Factory Default by default). It will not load the last saved configuration.

The Change Power On Set option allows you to select a custom set of configuration values as the power–on configuration. The example on the following page shows how to select Custom Set 1 as the power-on configuration.

NOTE: Be sure you define and save a custom set before attempting to use it as the Power On Custom Set. Otherwise, the current Power On Custom Set remains selected and the following operator panel message is displayed:

> 042 CUSTOM SET DOES NOT EXIST
> SAVE FIRST

For example, if you attempt to change the Power On Custom Set from Custom Set 1 to Custom Set 4, and if Custom Set 4 does not exist, Custom Set 1 remains the Power On Custom Set.

Step	Key	Result	Notes
1. Press:	Stop	NOT READY	Places the printer in NOT READY mode before changing the configuration.
2.	Scroll ↑ + Scroll ↓	OPERATOR MENU UNLOCKED	Unlocks Program mode and the Operator Menu, which allows you to load a configuration.
3.	Menu	OPERATOR MENU PRINTER CONTROL	Displays the first Configuration Main Menu option, PRINTER CONTROL.
4.	Scroll ↑ UNTIL	OPERATOR MENU CONFIGURATION MANAGEMENT	Moves from the Configuration Main Menu to the CONFIGURATION MANAGEMENT menu.
5.	Enter	CONFIGURATION MANAGEMENT RECALL CUSTOM SET	Moves forward to the RECALL CUSTOM SET parameter.
6.	Scroll ↑ OR Scroll ↓	CONFIGURATION MANAGEMENT CHANGE POWER ON SET	Moves to the CHANGE POWER ON SET parameter.
7.	Enter	CHANGE POWER ON SET FACTORY DEFAULT	Displays the first POWER ON SET option, FACTORY DEFAULT.
8.	Scroll ↑	CHANGE POWER ON SET CUSTOM SET 1	Displays CUSTOM SET 1 as the POWER ON SET option value.
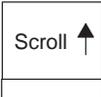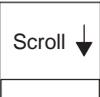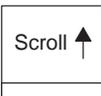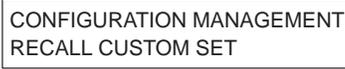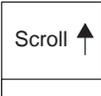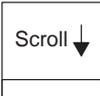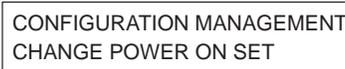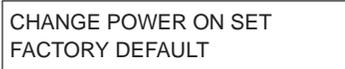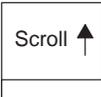
Step	Key	Result	Notes
9.	Enter	CHANGE POWER ON SET CUSTOM SET 1*	An * appears after the change is complete.
10.	Stop	NOT READY	Returns the printer to NOT READY mode.
11.	Scroll ↑ + Scroll ↓	OPERATOR MENU LOCKED	Locks Program mode and the Operator Menu.
12.	Start	READY	Places the printer in READY mode.

4 Configuration Menus

Chapter Contents

Overview

This chapter describes the configuration menus. The Configuration Main Menu options and all of the submenu options are illustrated in menu diagrams and described in detail. For procedures showing how to enter Program mode, save, recall, and print configurations, refer to Chapter 3, "Configuring the Printer."

Figure 4–1 shows an overview of the configuration menus.

NOTE: The menus that are displayed from the operator panel are determined by the installed features. For example, if you ordered the IPDS feature, then the IPDS menu would appear on the operator panel. If the IPDS feature is not installed, then the IPDS menu will not appear on the operator panel.

In this manual, the Coax and Twinax menus for the Coax/Twinax feature are documented in Chapter 3, "Configuring the Printer," and Chapter 4, "Configuration Menus," because many customers order this feature at the factory. The Coax/Twinax interface for the Multi–Platform Interface Coax/Twinax feature is documented in the *6400 Coax/Twinax Multi–Platform Interface Option Installation and Operation Guide.*

The menus for the IPDS, Code V, and IGP are documented in Appendix E: Code V, IGP, and IPDS Menus.

Each feature is shipped with a document that describes the feature in detail. For more information about these documents, see the "Related Documents" section that begins on page 1–3.

The configuration menu diagrams on the following pages show the structure of the configuration menus and the parameter options available in each menu. The diagrams list the menus and options in the order they appear when you use the operator panel to configure the printer. Factory default configuration values are indicated by an asterisk (*).

Pressing the operator panel keys (**Enter**, **Return**, **Scroll↑**, and **Scroll↓**) allows you to move through the menus and select various choices for the options, as follows:

- The **Enter** key allows you to move down to a lower level in the menu structure, and to select an option value as the active value.

- The **Return** key moves you back up the menu structure.

- The **Scroll**↑ key moves forward through the options at a particular menu level.

- The **Scroll**↓ key moves backward through the options at a particular menu level.

These keys are summarized in a legend box at the lower right corner of each configuration menu diagram.

The Configuration Main Menu

Printer Control
Page 4–10

Interface Selection
Display Language
Alarm Control
Print Direction
Hex Print Mode
Power On State
Paper Jam Detection
Forms Speed
Set Platen at Bottom
  of Form
Shuttle Timeout
Energy Saver Timer
OCR Font Density
Eject/Restore
PTR Setup Option
File System

Configuration Management
Page 4–17

Recall Custom Set
Save Current Values
Delete Custom Set
Change Power On Set
Protect Custom Sets
Print Custom Set Values

Twinax Interface [1]
Page 4–20

Print Language
Print Character Table
Active Print Language
Printer Emulation
Printer Address
World Trade
Cancel Buffers
Early Print Complete[2]
Hex Transparent Control
Undefined Character
  Reporting
Undefined Character
  Substitution
Load Alternate Character
  Option
Print Text Direction
Override Host
Format Control
Hex Print Mode
C/T Hotport

Coax Interface [1]
Page 4–29

Print Language
Print Character Table
Active Print Language
PA1
PA2
Buffer Reprint
Printer Emulation
Early Print Complete
Cancel Buffers
Hex Transparent Control
Mono/Dual Case
Undefined Character
  Substitution
Print Text Direction
Image Buffer Size
Intervention Required
Compatibility Options
Translate Table
Override Host
Format Control
C/T Hotport
Hex Print Mode

Ethernet [4] **Parameters**
Page 4–42

IP Address
Gateway Address
Subnet Mask
MAC Address
Novell Protocol
NetBIOS Protocol
Novell Frame
Printer Manager
  Port Number
Printer Manager
  Timeout
Ethernet Hotport
Buffer Size in
  Kilobytes

Parallel [5] **Interface**
Page 4–45

Interface Type
PC Parallel
Dataproducts
IEEE 1284
Parallel Hotport

Serial Interface
Page 4–53

Interface Type
Data Protocol
Baud Rate
Data Bits
Stop Bits
Parity
Data Terminal Ready
Request to Send
Buffer Size in Kilobytes
Poll Character
One Char Enquiry
Serial Hotport

Emulation Configuration
Page 4–58

IPDS[3]
Code V Emulation[3]
IGP Emulation[3]
ASCII Printer
  Emulation
Printer Emulation
  Configuration
Print Format

Operator Print Tests
Page 4–90

Printer Demonstration
Print Error Log
Ripple Print
All E's
All H's
All E's + FF
Underlines
Ethernet Test Page[4]

Printer Information
Page 4–92

Installed Memory
Power On Time:
Printing Time:
Print Strokes
11 Inch Pages

RibbonMinder
Page 4–93

New Ribbon
Ribbon Action
Ribbon Size
Ribbon Adjust
Fault Action

Notes:

[1] The Twinax and Coax interface menus only appear in the menus if the IBM Coax/Twinax feature is installed. If the Multi–Platform Interface Coax/Twinax feature is installed the Twinax and Coax Interface menus are not displayed because the Multi–Platform Interface feature does not use these menus.

[2] The Early Print Complete option appears in the Twinax menu only if the IPDS feature is installed.

[3] IPDS, Code V Emulation, and IGP Emulation options appear in the menus only if these features are installed. Menus are shown in Appendix D.

[4] Ethernet information only appears when the ethernet feature is installed.

[5] Either the Ethernet Interface menu or the Parallel Interface menu will be displayed. They can not both be displayed at the same time.

To view options, press:

Scroll ↑   Scroll ↓   **Enter**   Return

To select an option, press: **Enter**

To exit the configuration menus and return to READY, press: Start

* = Factory Default

Figure 4–1. The Configuration Main Menu

Printer Control Menu

```
┌──────────────────┐
│     PRINTER      │
│     CONTROL      │
│  (From page 4–9) │
└──────────────────┘
```

Interface Selection	Display Language	Alarm Control	Print Direction	Hex Print Mode	Power On State
Twinax[1]	English*	Alarm Enabled*	Bidirectional*	Disable*	Ready*
Coax[1]	German	Alarm Disabled	Unidirectional	Enable	Not Ready
Ethernet[4]	French				
Parallel*	Italian				
Serial	Spanish				
Auto Switching	Dutch				
	Portuguese				

Paper Jam Detection	Forms Speed	Set Platen at Bottom of Form	Shuttle Timeout	Energy Saver Timer
Enable*	Normal Speed*	Disable*	1–60 Seconds	Instant
Disable	Slow Speed	Open	5 Seconds*	5 – 30 Seconds
				1 – 60 Minutes
				15 Minutes*

OCR Font Density	Eject/Restore	PTR Setup Option	File System	Power Stacker[3]
120 Dots Per Inch*	Standard*	Setup Parse	Overwrite	Enable*
180 Dots Per Inch	Top Exit Tear[2]	Disable*	Enable*	Disable
		Enable	Disable	
		Setup SFCC	View File List	
		1 – FF	Version	
		21h*	Delete Files	
			Version	
			Optimize & Reboot	
			Print File List	

Note:

[1] The Twinax and Coax interface menus only appear in the menus if the IBM Coax/Twinax feature is installed. If the Multi–Platform Interface Coax/Twinax feature is installed the Twinax and Coax Interface menus are not displayed because the feature does not use these menus.

[2] Top exit tear path can only be selected on pedestal models.

[3] If the Power Paper Stacker is installed.

[4] Either the Ethernet Interface menu or the Parallel Interface menu will be displayed. They can not both be displayed at the same time.

```
┌──────────────────────────────────────────┐
│ To view options, press:                  │
│                                          │
│ Scroll ↑   Scroll ↓   Enter   Return     │
│ ┌────┐     ┌────┐    ┌────┐   ┌────┐     │
│ └────┘     └────┘    └────┘   └────┘     │
│                               Enter      │
│ To select an option, press:   ┌────┐     │
│                               └────┘     │
│ To exit the configuration menus  Start   │
│ and return to READY, press:   ┌────┐     │
│                               └────┘     │
│  * = Factory Default                     │
└──────────────────────────────────────────┘
```

Figure 4–2. Printer Control Menu

Interface Selection

INTERFACE SELECTION enables or disables physical interfaces for attachment switching. If an interface is disabled, it is set offline and any data received will be ignored.

When coax or twinax is selected, a POR status is sent to the host.

Selecting Autoswitching provides automatic interface switching among parallel, serial, and either coax or twinax communication. Only one interface can be enabled at a time. Configuration of the Auto Switching Hotport is done from the corresponding interface menu, as shown in the following sections.

When used with serial, parallel and coax or twinax non–IPDS emulations, Autoswitching does NOT save the state of each emulation during interface switching. In this case, it is the responsibility of the host application program to initialize the emulation to the desired state as the beginning of each job. It is also the responsibility of the host application program to correctly position the forms at "top of form" and the end of each job. When used with coax or twinax IPDS, Autoswitching does save the state of the IPDS emulation during interface switching and will also correctly position the forms at "top of form" at the end of each IPDS job.

NOTE: If the Multi–Platform Interface Coax/Twinax feature is installed, the feature provides automatic interface switching between parallel and either coax or twinax communications. Refer to the *Coax/Twinax Multi–Platform Interface Option Installation and Operation Guide* for more information.

Display Language

This parameter selects the language in which the operator panel messages will be displayed.

Alarm Control

This parameter enables or disables the audible alarm. The audible alarm is used to signal problems such as when an end of forms occurs.

Print Direction

The PRINT DIRECTION feature affects both print quality and printing speed. By setting this feature, you can configure the printer to print in both directions of the shuttle sweep (BIDIRECTIONAL), or to print in only one direction (UNIDIRECTIONAL).

You might want to use UNIDIRECTIONAL when printing bar codes, high quality text and graphics, or other printing that requires precise vertical alignment.

Although enabling this feature reduces print speed, it enhances the vertical alignment of dots and produces cleaner, sharper bar codes and text.

- BIDIRECTIONAL (the default) will print all data in both directions of the shuttle sweep. This choice produces higher printing speed.

- UNIDIRECTIONAL will print all data in only one direction of the shuttle sweep. This choice produces higher print quality.

Hex Print Mode

A hex code printout (or hex dump) translates all incoming data to hexadecimal equivalents. A hex dump lists each ASCII data character received from the host computer, together with its corresponding two-digit hexadecimal code. Hex dumps can be used to troubleshoot some types of printer data reception problems.

Refer to page 6–9 to obtain a hex code printout.

NOTE: Printing in Hex Mode may alter print attributes set at the operator panel or by the host computer. These attributes may need to be reset after exiting Hex Print Mode.

Power On State

This parameter allows you to configure the printer to power on in the READY or NOT READY mode.

Paper Jam Detection

This parameter determines whether or not paper jam detection is active. When set to ENABLE (the default), paper jams are detected and when set to DISABLE, paper jam checking is disabled to prevent false errors.

ATTENTION

When paper jam detection is disabled, the printer does not monitor paper motion. If a paper jam occurs, the printer ignores the condition and continues to print, possibly causing severe damage to the printer.

Forms Speed

FORMS SPEED affects the speed at which paper moves into the stacking area of the printer.

- NORMAL SPEED (the default) will slew and stack paper, such as single–sheet data processing paper, at maximum speed.
- SLOW SPEED will slew and stack at a slower pace. This ensures that forms, such as multiple–sheet (i.e. invoice), will stack more neatly.

Set Platen at Bottom of Form

Some special forms have perforation areas that are thicker than the rest of the form. Enable this parameter when you are using this type of form. This parameter, when open is selected, allows the platen to open and close when perforations thicker than the rest of a form move across the platen.

In order to retain print quality with this type of form, set the position of the first and last print lines to avoid printing where paper thickness occurs (before and after the perforation). See Forms Length and Perforation Skip for more information.

NOTE: When enabling this parameter, you must set the forms length to match the physical distance between perforations.

Shuttle Timeout

The SHUTTLE TIMEOUT parameter determines the amount of time the shuttle will continue running after printing stops. This allows the shuttle to continue moving during the time between print jobs when the print jobs arrive at frequent intervals. Time is saved if the shuttle is still moving when a print job arrives at the printer, since the printer does not have to wait for the shuttle to reach its operating speed.

Energy Saver Timer

This parameter helps to reduce power consumption when the printer is not in use in order to reduce air pollution caused by power generation. Use of this feature can cut energy use by more than 50 percent.

ENERGY SAVER TIMER determines the amount of time that expires before the printer reduces power after printing stops. The energy saver mode can select an energy saver activation time from instant to 60 minutes. The selections are Instant; 5, 10, 15, 30 Seconds; and 1, 5, 10, 15, 30, 45, 60 Minutes. The default time is 15 minutes.

NOTE: If the printer enters energy saver mode while NOT READY, the printer will not print any jobs until made READY by pressing the **Start** key.

OCR Font Density

OCR FONT DENSITY determines the print quality for OCR A and OCR B character sets. The following options are available:

- **120** (the default). Vertical is 144; horizontal is 120.
- **180** Vertical is 144; horizontal is 180.

NOTE: The higher the resolution selected, the slower the print speed. When selecting a resolution, try to balance the resolution quality your application requires with how fast you want the print job to print.

Eject/Restore

The EJECT/RESTORE parameter controls how the printer behaves when the user presses the **Eject/Restore** key. The following options are available:

- STANDARD (the default)
- TOP EXIT TEAR (pedestal models only)

When STANDARD mode is selected, the **Eject/Restore** key operates as follows:

- Pressing **Eject/Restore** causes the paper to advance a preset distance of 22 inches.

- Pressing **Ready** or pressing **Eject/Restore** a second time causes the paper to return to its original position.

NOTE: If you are using this function to tear off forms, you might want to press **Form Feed** before using the **Eject/Restore** function. This will avoid unloading the paper as it is restored to its original position.

When TOP EXIT TEAR mode is selected, the **Eject/Restore** key operates as follows:

- Pressing **Eject/Restore** causes the paper to advance the bottom of the last printed form to the tear position, ready for the operator to tear off the printed forms.

- Pressing **Eject/Restore** a second time causes the paper to move into position such that the top of the first possible form available for printing is positioned ready for printing. (The direction and amount of paper movement will depend on the length of the forms; one or more blank forms will be skipped.)

NOTE: The TOP EXIT TEAR setting is meaningful only on pedestal model printers. TOP EXIT TEAR cannot be selected on cabinet model printers.

Forms length must be set correctly for the TOP EXIT TEAR mode to function properly.

PTR Setup Option

This option selects the Special Function Control Code (SFCC) for the PTR_SETUP command and functions. The selections for this process are given below.

Setup Parse

This selection is used to enable or disable the PTR Setup Option. The default is disable.

Setup SFCC

Sets the legal hex values from 01 through FF. These represent the ASCII code (in hexadecimal) of the character used as the SFCC. The default hex value is 21, which corresponds to the "!" character.

File System

Provides the means for listing, viewing, and manipulating files in flash memory. The following selections are available.

Overwrite

This selection controls whether the files in flash memory can be overwritten. With the default selection of Enable, files are overwritten. If the selection is disabled, the files can not be overwritten.

View Files

This selection provides a list of files in flash memory. Pressing the **Scroll↓** key allows you to view the file size.

Delete Files

This selection provides a list of files in flash memory. Pressing the **Enter** key will delete the displayed file from flash memory.

Optimize & Reboot

Pressing the **Enter** key with this selection displayed will reclaim flash memory space and reboot the printer.

IMPORTANT

Do not turn the printer off until it has completed the reboot and is either Ready or Not Ready.

Print File List

Pressing the **Enter** key with this selection displayed will cause the printer to print a summary of files stored in flash memory. Statistics on file system usage are also printed.

Power Stacker

This parameter determines whether or not the power paper stacker is enabled, which is the default, or disabled. This parameter is not presented if the power paper stacker is not installed.

Configuration Management Menu

CONFIGURATION MANAGEMENT
(From page 4–9)

Recall Custom Set

Factory Default*
Custom Set 1
Custom Set 2
Custom Set 3
Custom Set 4
Custom/Preloaded Set 5
Custom/Preloaded Set 6
Custom/Preloaded Set 7
Custom/Preloaded Set 8

Save Current Values

Custom Set 1*
Custom Set 2
Custom Set 3
Custom Set 4
Custom/Preloaded Set 5
Custom/Preloaded Set 6
Custom/Preloaded Set 7
Custom/Preloaded Set 8

Delete Custom Set

Custom Set 1*
Custom Set 2
Custom Set 3
Custom Set 4
Custom/Preloaded Set 5
Custom/Preloaded Set 6
Custom/Preloaded Set 7
Custom/Preloaded Set 8

Change Power On Set

Factory Default*
Custom Set 1
Custom Set 2
Custom Set 3
Custom Set 4
Custom/Preloaded Set 5
Custom/Preloaded Set 6
Custom/Preloaded Set 7
Custom/Preloaded Set 8

Protect Custom Sets

Disable*
Enable

Print Custom Set Values

Current Custom Set*
Factory Default
Power On Custom Set
All Custom Sets
Custom Set 1
Custom Set 2
Custom Set 3
Custom Set 4
Custom/Preloaded Set 5
Custom/Preloaded Set 6
Custom/Preloaded Set 7
Custom/Preloaded Set 8

To view options, press:

Scroll ↑   Scroll ↓   **Enter**   Return

Enter
To select an option, press:

To exit the configuration menus   Start
and return to READY, press:

*   = Factory Default

Figure 4–3. Configuration Management Menu

Recall Custom Set

The printer can store 8 custom sets in NVRAM. This parameter allows you to select and load a specific custom set.

Factory Default is the factory-preset custom set; its parameters cannot be changed. It is always available for loading.

Custom/Preloaded Sets 5–8 contain configuration sets that assist with the installation and configuration of this printer. These sets are preloaded at the factory. If these sets are not used, you can delete them and create new custom sets. For example, Custom/Preloaded Set 8 is preconfigured for the Coax/Twinax Multi–Platform Feature; but if you do not intend to use this feature, you can delete Custom/Preloaded Set 8 or overwrite it with a new set of configuration values. Following is a brief description of Custom/Preloaded Sets 5–8:

- Custom/Preloaded Set 5 is used when configuring this printer to function like a Printronix printer. This custom set contains ASCII emulations used by Printronix compatible printers along with initial defaults (Overstrike, Auto LF, etc.). The initial ASCII default emulation is P–Series which may need to be altered for P–Series XQ or Serial Matrix in some applications. For more information, refer to the Configuration Utility Diskette shipped with this printer, or the *6400 ASCII Programmer's Reference Manual.*

- Custom/Preloaded Set 6 contains the default settings for an ASCII printer using a set of Epson and Proprinter default values. This could be useful when the printer has the Coax/Twinax feature, but is sometimes run as an ASCII printer. Refer to the *6400 Coax/Twinax Programmer's Reference Manual* for more information.

- Custom/Preloaded Set 7 contains default settings for a Twinax printer without IPDS. This could be useful when the printer contains the IPDS feature, but must occasionally be used as a non–IPDS printer. Refer to the *6400 IPDS Programmer's Reference Manual* or the *6400 Coax/Twinax Programmer's Reference Manual* for more information.

- Custom/Preloaded Set 8 contains a custom set for use with the optional Coax/Twinax Multi–Platform Interface feature. Refer to the *Coax/Twinax Multi–Platform Feature Installation and Operation Guide* for more information on this custom set.

Save Current Values

This option allows you to save your custom sets to meet different print job requirements. This eliminates the need to change the parameter settings for each new job.

The custom sets are stored in NVRAM—they will not be lost if you power off the printer.

Factory default is a factory-preset custom set; it cannot be changed or saved.

IMPORTANT

A new custom set will *overwrite* an existing custom set if the PROTECT CUSTOM SETS parameter is disabled (e.g., a new Custom Set 4 will overwrite an existing Custom Set 4). See the "Protect Custom Sets" in this section.

Delete Custom Set

You can delete one or all of your customized or preloaded custom sets. Factory default is a factory-preset custom set and cannot be changed or deleted.

Change Power On Set

You can specify which of the custom sets will be the power–on custom set. The printer will power on with the factory set values or with one of the customized configurations.

Protect Custom Sets

The PROTECT CUSTOM SETS option specifies whether or not a new custom set can overwrite an existing custom set when you activate the SAVE CURRENT VALUES parameter.

- DISABLE (the default) turns protection off, allowing you to overwrite existing custom sets.
- ENABLE turns protection on, preventing you from overwriting existing custom sets. If you attempt to save to an existing set, the following operator panel message appears:

043 CUSTOM SET ALREADY EXISTS
DELETE FIRST

You must delete the existing set before trying to save the new custom set.

Print Custom Set Values

This option is used to print a listing of various stored printer custom sets. It is recommended that you store the printout of the custom sets in a safe place for quick referral.

Twinax Interface Menu

TWINAX INTERFACE[4]

(From page 4–9)

Print Language	Print Character Table[3]	Active Print Language	Printer Emulation	Printer Address	World Trade

See page 4–21.

Standard Print Language*
Alternate Print Language

4234-2*
5225
4234-12[1]

Address 0
Address 1*
Address 2
Address 3
Address 4
Address 5
Address 6

Standard Print Language*
Alternate Print Language

Cancel Buffers	Early Print Complete[2]	Hex Transparent Control	Undefined Character Reporting	Undefined Character Substitution	Load Alternate Character Option

Enable*
Disable

Disable*
Enable

Lead–In Characters
Set 1 <%>*
Set 2 ¬ ¬ $
Set 3 _%_
Alternate Set 80– 9F
Control Code
Printable*

Enable*
Disable

60*
40–FE (HEX)

Enable*
Disable

Print Text Direction	Override Host	Format Control	Maximum Printable Width	Hex Print Mode[3]	C/T Hotport

Control By Host*
Left to Right
Right to Left

Disable*
Enable

Disable*
Enable

13.2 inches*
13.6 inches

Disable*
Enable

Port Type
  Twinax – Coax – Disable*
Timeout
  10 Sec–180 Sec (15 Sec*)
Report Status
  Disable* – Enable

Notes:

[1] If the IPDS feature is installed, the 4234–12 option is the default, and it will appear in this menu. If IPDS is not installed, the 4234–12 option will not appear in this menu, and 4234–2 is the default.

[2] If the IPDS feature is installed, the EARLY PRINT COMPLETE option will appear in this menu. Refer to Appendix E, *Optional Features*, for more information.

[3] Does not apply to IPDS.

[4] The Twinax and Coax interface menus only appear in the menus if the IBM Coax/Twinax feature is installed. If the Multi–Platform Interface Coax/Twinax feature is installed the Twinax and Coax Interface menus are not displayed because the feature does not use these menus.

To view options, press:

Scroll ↑   Scroll ↓   **Enter**   Return

Enter

To select an option, press:

To exit the configuration menus and return to READY, press: Start

* = Factory Default

Figure 4–4. Twinax Interface Menu

```
┌─────────────────────────┐
│ PRINT LANGUAGE          │
│                         │
│ (From page 4–20)        │
└─────────────────────────┘
          │
    ┌─────┴──────────────────────┐
┌───────────────┐        ┌───────────────┐
│ Standard Print│────────│ Alternate Print│
│ Language      │        │ Language      │
└───────────────┘        └───────────────┘
```

0037	English (USA/Canada)*	English US*
0037	English (Netherlands)	Austrian/German
0500	Swiss Bilingual	Belgian
0500	Belgian New	Brazilian
0273	Austrian/German	Canadian French
0274	Belgian Old	Danish/Norwegian
0275	Brazilian	Finnish/Swedish
0260	Canadian French	French
0277	Danish/Norwegian	Italian
0278	Finnish/Swedish	Japanese English
0297	French/French Azerty	Japanese Katakana
0280	Italian	Portuguese
0281	Japanese English	Spanish
0282	Portuguese	Spanish Speaking
0284	Spanish/Spanish Speaking	English UK/Ireland
0285	English (UK/Ireland)	Multinational
0892	OCR A	
0893	OCR B	
0424	Hebrew	
0803	Hebrew Old (089)	
0420	Arabic	
0880	Cyrillic Old	
0423	Greek Old	
0875	Greek New	
0871	Icelandic	
0290	Japanese Katakana	
0870	Latin2/Roece/Multilingual	
0838	Thai	
1026	Turkish	
0890	Yugoslav Old	
1097	Farsi	
1025	Cyrillic Multilingual	
0256	International Set 1	
1112	Baltic Multilingual	
0924	Euro Latin 9	
1122	Estonian	
1140	Euro English (USA/Canada)	
1141	Euro Austrian/German	
1142	Euro Danish/Norwegian	
1143	Euro Finnish/Swedish	
1144	Euro Italian	
1145	Euro Spanish Speaking	
1146	Euro English (UK/Ireland)	
1147	Euro French (Azerty 105)	
1148	Euro Swiss Bilingual	
1149	Euro Icelandic	
0500	International Set 5	

```
┌──────────────────────────────────────┐
│ To view options, press:              │
│                                      │
│ Scroll ↑  Scroll ↓  Enter   Return   │
│ [____]   [____]    [____]   [____]    │
│                                      │
│                            Enter     │
│ To select an option, press:  [____]  │
│                                      │
│ To exit the configuration menus  Start │
│ and return to READY, press:     [____] │
│                                      │
│  *  = Factory Default                │
└──────────────────────────────────────┘
```

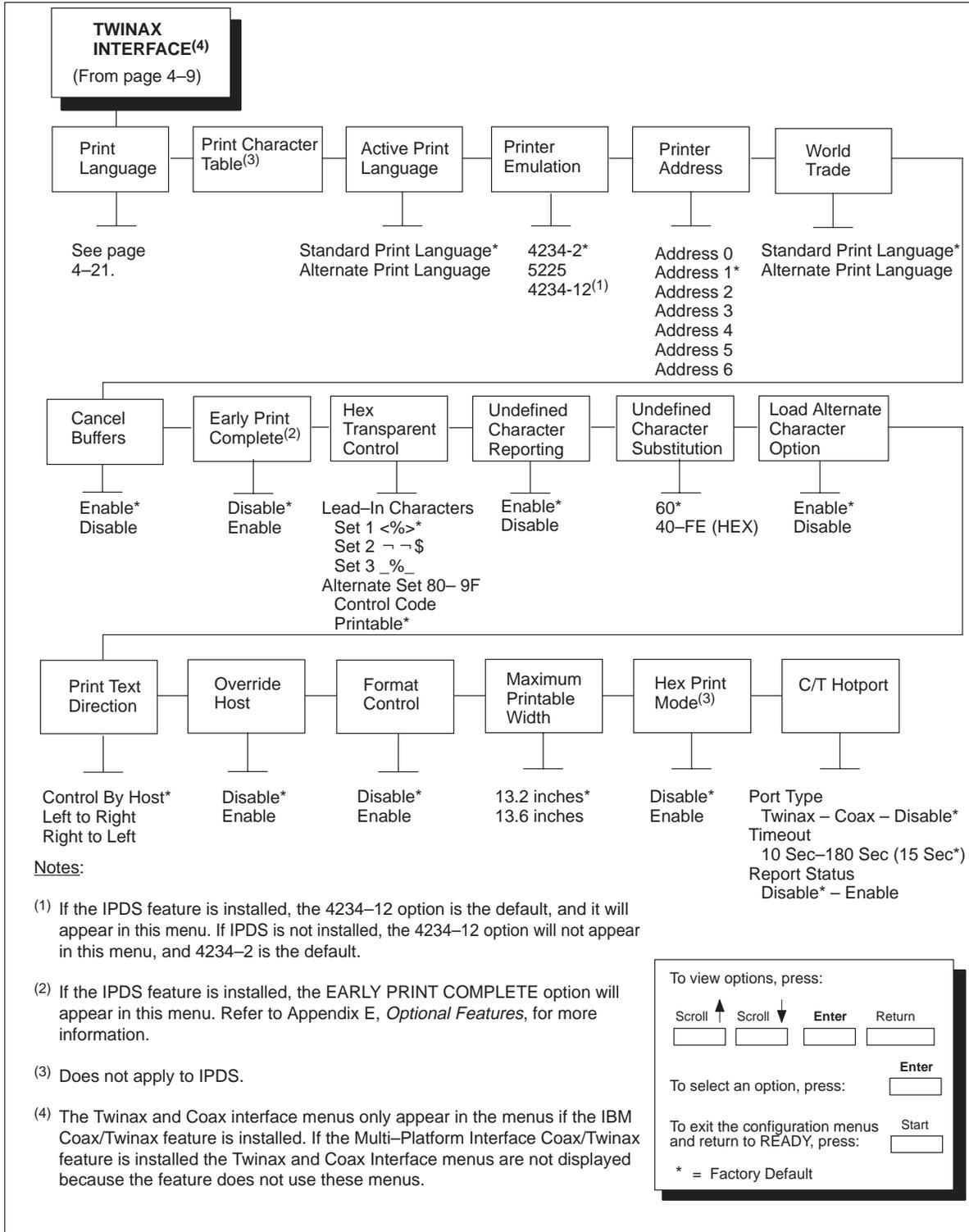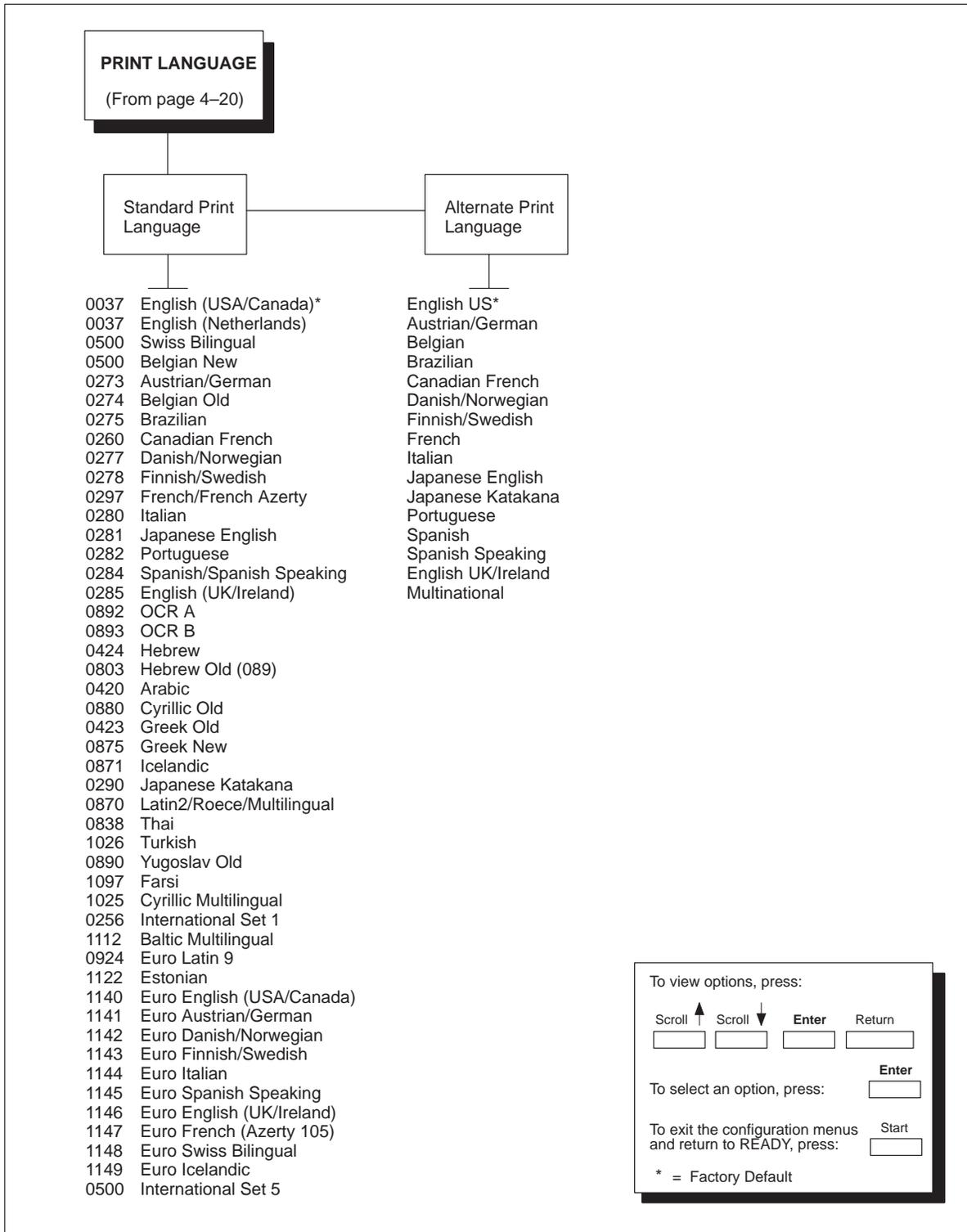**Figure 4–5. Twinax Print Language Menu**

Print Language

PRINT LANGUAGE specifies the set of print languages used by the printer. Refer to Figure 4–5 for print language menus.

- STANDARD PRINT LANGUAGE (the default)
- ALTERNATE PRINT LANGUAGE provides code pages compatible with 6408/6412 Model CT0 printers. Use this option with the 5225 printer emulation.

Specifying a print *quality* of OCR A or OCR B will change the print *language* to OCR A or OCR B.

When OCR A or OCR B is selected as the default print language, OCR A and OCR B are the only available values for this print quality. If a different print quality value is desired, the print language must be changed first.

Print Character Table

PRINT CHARACTER TABLE prints out a table of the twinax interface current character set.

Character sets are shown in the *6400 Coax/Twinax Programmer's Reference Manual*.

Active Print Language

ACTIVE PRINT LANGUAGE specifies which print language set will be the active set.

- STANDARD PRINT LANGUAGE (the default)
- ALTERNATE PRINT LANGUAGE

Printer Emulation

This parameter defines the printer emulation, as follows:

- 5225
- 4234–2 (the default)
- 4234–12

The 4234–12 selection is only present if the IPDS feature is installed. The 4234–12 selection is also the default if the IPDS feature is installed, otherwise, the 4234–2 is the default.

After the emulation has been changed, a POR status is sent to the host.

Printer Address

PRINTER ADDRESS allows you to set the device address from 0 through 6. The host directs data and commands on the twinax line to a specific device based on its unique device address.

After the address has been changed, a POR status is sent to the host.

World Trade (5225 Only)

The 5225 emulation has a multinational character set that serves as a base for 14 world trade character set assortments. They are shown in the *6400 Coax/Twinax Programmer's Reference Manual*.

You can configure the printer to use the STANDARD CHARACTER SET so the printer contains the IBM World Trade character set, such as the Austria/Germany character set. Or, you can select EXTENDED CHARACTER SET and use the multinational character set as a base with the selected world trade character set overlaid. Ensure that you select ALTERNATE PRINT LANGUAGE.

Cancel Buffers

CANCEL BUFFERS has the following options:

- ENABLE (the default) cancels all buffers when a job is put on hold from the host or the **Cancel** key is pressed.
- DISABLE clears the twinax internal buffer, not the print engine buffers, when a job is put on hold from the host or the **Cancel** key is pressed.

Early Print Complete

Early Print Complete allows the printer to send Print Complete status to the host before the printer is actually done printing all data. Early Print Complete is only available if the IPDS feature is installed.

- DISABLE (the default) means the printer will suppress the Early Print Complete response until all printing is complete.

- ENABLE means the printer will send an acknowledgement to the host when it is able to accept more data.

NOTE: When an Early Print Complete is enabled and an error occurs, the data in the printer will remain in the buffer (regardless of the setting of the Cancel Buffer option). It is recommended that local procedures be followed to recover from the error.

NOTE: Do not select Early Print Complete while a print job is in progress. If this is done you will need to restart the printer.

Hex Transparent Control

This option allows you to enable (the default) or disable additional features that are not available in standard IBM emulations. To access these features, send lead–in character text commands in the data stream. You can also use ASCII codes 80 hex through 9F hex as control codes if configured to do so.

Lead–In Characters

The Lead–In Character commands must have a start and end code. Set 1 is the factory default. Three sets (each containing a start and end code) are available:

- Set 1: start code = <%
         end code = >
- Set 2: start code = ¬ ¬
         end code = $
- Set 3: start code = _%
         end code = _

Alternate Set 80 – 9F

This selection determines if ASCII codes 80 hex through 9F hex will be used as control codes or printed as standard printable characters.

- Printable (the default) prints the alternate set as standard characters
- Control Code selects the alternate set to be used as printer control codes.

Undefined Character Reporting

UNDEFINED CHARACTER REPORTING allows overriding of the host setting of the SGEA (Set Graphic Error Action) command. For more

information about the SGEA command, refer to the *6400 Coax/Twinax Programmer's Reference Manual*.

- ENABLE (the default) is the host setting for the SGEA and is used by the printer. If the SGEA command is requested to stop on graphic errors, the printer will stop when a graphic error is detected.
- DISABLE ignores the SGEA command from the host. The printer does not stop when an error is detected; instead, it substitutes the character selected in the "UNDEFINED CHARACTER SUBSTITUTION" menu entry.

Undefined Character Substitution

UNDEFINED CHARACTER SUBSTITUTION specifies the replacement character to print in place of any unprintable character that is received from the host. The character becomes the printer default when:

- The printer is powered off and then powered on.
- An SGEA command specifies to use the operator panel default.
- The "UNDEFINED CHARACTER REPORTING" option is disabled.

The character code point can range from hex 40 to hex FE. The factory default is set to hex 60.

Load Alternate Character Option

The LOAD ALTERNATE CHARACTER (LAC) OPTION allows the host system to load alternate character images into the printer. This may be used for designing graphics, bar codes, and charts, or for printing in foreign languages.

- ENABLE (the default) prints the LAC character as defined.
- DISABLE ignores the LAC definition from the host and prints from the currently selected character set.

Print Text Direction

PRINT TEXT DIRECTION specifies the direction in which characters are printed on the page. This allows the printer to print languages that are printed right to left instead of left to right.

- CONTROL BY HOST (the default)
- LEFT TO RIGHT
- RIGHT TO LEFT

Override Host

OVERRIDE HOST determines whether the printer executes certain commands sent by the host, or continues to use the current printer settings. The following host commands are ignored when OVERRIDE HOST is enabled: line length, forms length, lines per inch (LPI), characters per inch (CPI), print quality, and text orientation (i.e. left to right). When OVERRIDE HOST is enabled, these settings retain their operator panel settings.

NOTE: Host margin and tab settings will be used whether or not OVERRIDE HOST is enabled.

- DISABLE (the default) allows certain host commands (line length, forms length, LPI, CPI, print quality, and text orientation) to override operator panel settings. Note that the information appearing on the message display may *not* match the data stream setting. No values will change upon initial selection of the disable option.
- ENABLE permits operator panel settings to override host data stream commands.

Format Control

FORMAT CONTROL enables the printer to reflect the same spacing as 6408/6412 Model CT0 printers after absolute and relative move commands are executed. The following options are available:

- ENABLE reflects 6408/6412 Model CT0 distance, generated by the Code V feature, IGP feature, and Hex Transparent control code sequence, in the new position (after absolute and relative move commands are executed).
- DISABLE (the default) does not reflect distance, generated by the Code V feature, IGP feature, and Hex Transparent control code sequence, in the new position (after absolute and relative move commands are executed).

Maximum Printable Width

MAXIMUM PRINTABLE WIDTH sets the maximum width of the printer when using a CT host interface.

- 13.2 INCHES (the default)
- 13.6 INCHES

NOTE: The twinax interface menu and coax interface menu option for maximum printable width use the same internal variable. Setting this option in either menu will make it the current setting for the printer, independent of the interface used.

NOTE: Although the LP+ emulation maintains width in characters, the maximum printable width in characters is controlled by the same internal variable that is set by the twinax interface menu and coax interface menu option for maximum printable width option.

Hex Print Mode

When enabled, the HEX PRINT MODE parameter prints the EBCDIC data and control codes received from the host as hex values. Refer to page 6–9 to obtain a hex code printout.

NOTE: Printing in Hex Mode may alter print attributes set by the host computer. A power cycle may be required after changing HEX PRINT MODE from enable to disable.

C/T Hotport

Gives the printer the ability to handle multiple data streams simultaneously. It allows the printer to service hosts attached to the serial, parallel, and either coax or twinax ports as if they were the only interface connected.

Report Status

When this option is enabled, faults are reported even if the fault is not on the current active port. If the option is disabled, a fault on the printer is reported only if it occurs on the active port.

Port Type

Selects the type of port to be used. The Disable selection disables the port
from the hotport process. The available selections are:

- Twinax (the default)
- Coax
- Disable

Timeout

This is the value used by the printer to time out from the current port and
check the other ports for data to print. When the printer has not received data
from the host after the specified period of time, it needs to Timeout in order
to service the other ports. The available selections are 10 to 180 seconds. The
default is 15 seconds.

Coax Interface Menu

Figure 4–6. Coax Interface Menu

```
                    COAX
                    INTERFACE(3)
                    (From page 4–9)
```

Print Language	Print Character Table(2)	Active Print Language	PA1(1)	PA2(1)	Buffer(1) Reprint
See page 4–30.		Standard Print Language* Alternate Print Language	Disable* Enable	Disable* Enable	Disable* Enable

Printer Emulation	Early Print Complete	Cancel Buffers	Hex Transparent Control	Mono/Dual Case	Undefined Character Substitution
4234* 3287	Disable* Enable	Enable* Disable	Lead–In Characters Set 1 <%>* Set 2 ¬ ¬ $ Set 3 _%_ Alternate Set 80– 9F Control Code Printable*	Dual Case* Mono Case	40–FE (HEX) 60*

Print Text Direction	Image Buffer Size	Intervention Required	Compatibility Options	Translate Table	Override Host
Control By Host* Left to Right Right to Left	4K* 2K	Send to Host* Not Send to Host	See page 4–38	Default* Downloaded	Disable* Enable

Format Control	Maximum Printable Width	C/T Hotport	Hex Print Mode(2)
Disable* Enable	13.2 inches* 13.6 inches	Port Type Twinax* – Coax – Disable Timeout 10 Sec–180 Sec (15 Sec*) Report Status Disable* – Enable	Disable* Enable

Note:

(1) In coax mode, the options for PA1, PA2, and Buffer Reprint are displayed only when the coax line is active.

(2) Does not apply to IPDS.

(3) The Twinax and Coax interface menus only appear in the menus if the IBM Coax/Twinax feature is installed. If the Multi–Platform Interface Coax/Twinax feature is installed the Twinax and Coax Interface menus are not displayed because the feature does not use these menus.

To view options, press:

Scroll ↑   Scroll ↓   **Enter**   Return

To select an option, press: **Enter**

To exit the configuration menus and return to READY, press: Start

* = Factory Default

PRINT LANGUAGE

(From page 4–29)

Standard Print Language	Alternate Print Language

0037 English (USA/Canada)*	English US*
0037 English (Netherlands)	English UK/Ireland
0285 English (UK/Ireland)	Austrian/German
0273 Austrian/German	Austrian/German (Alternate)
0274 Belgian Old	Belgian
0275 Brazilian	Brazilian
0260 Canadian French	Canadian French
0277 Danish/Norwegian	Danish/Norwegian
0287 Danish/Norwegian (alternate)	Danish/Norwegian (Alternate)
0278 Finnish/Swedish	Finnish/Swedish
0288 Finnish/Swedish (alternate)	Finnish/Swedish (Alternate)
0297 French/French Azerty	French
0500 International Set 5	International
0280 Italian	Italian
0281 Japanese English	Japanese English
0282 Portuguese	Japanese Katakana
0284 Spanish/Spanish Speaking	Portuguese
0289 Spanish (alternate)	Portuguese (Alternate)
0500 Swiss Bilingual	Spanish
0500 Belgian New	Spanish (Alternate)
0803 Hebrew Old (089)	Spanish Speaking
0424 Hebrew	Swiss Bilingual
0892 OCR A	
0893 OCR B	
0420 Arabic	
0880 Cyrillic Old	
0423 Greek Old	
0875 Greek New	
0871 Icelandic	
0290 Japanese Katakana	
0870 Latin 2/Roece/Multilingual	
0838 Thai	
1026 Turkish	
0890 Yugoslav Old	
1097 Farsi	
1025 Cyrillic Multilingual	
0905 Turkish Old	
0256 International Set 1	
0924 Euro Latin 9	
1140 Euro English (USA/Canada)	
1141 Euro Austrian/German	
1142 Euro Danish/Norwegian	
1143 Euro Finnish/Swedish	
1144 Euro Italian	
1145 Euro Spanish Speaking	
1146 Euro English (UK/Ireland)	
1147 Euro French (Azerty 105)	
1148 Euro Swiss Bilingual	
1149 Euro Icelandic	

To view options, press:

Scroll ↑   Scroll ↓   **Enter**   Return

Enter

To select an option, press:

To exit the configuration menus
and return to READY, press: Start

* = Factory Default

Figure 4–7. Coax Print Language Menu

Print Language

PRINT LANGUAGE specifies the set of print languages used by the printer. Refer to Figure 4–7 for print language menus.

- STANDARD PRINT LANGUAGE (the default)
- ALTERNATE PRINT LANGUAGE provides code pages compatible with 6408/6412 Model CT0 printers. Use this option with the 3287 printer emulation.

Specifying a print *quality* of OCR A or OCR B will change the print *language* to OCR A or OCR B.

When OCR A or OCR B is selected as the default print language, OCR A and OCR B are the only available values for this parameter. If a different print quality value is desired, the print language must be changed first.

Print Character Table

PRINT CHARACTER TABLE prints out a table of the coax interface current character set.

All coax character sets are shown in the *6400 Coax/Twinax Programmer's Reference Manual*.

Active Print Language

ACTIVE PRINT LANGUAGE specifies which print language set will be the active set.

- STANDARD PRINT LANGUAGE (the default)
- ALTERNATE PRINT LANGUAGE

PA1

PA1 is only valid when the printer is in the NOT READY state and the coax System Network Architecture Character Set (SCS) data stream is active. This function displays the "PA1 ENABLED" message when the **Enter** key is pressed and sends a special operator request to the host when the printer is made READY.

Refer to the *6400 Coax/Twinax Programmer's Reference Manual* for more information about SCS.

NOTE: Selecting the PA1 menu item again ("PA1 DISABLED" appears on the operator panel) or selecting the PA2 menu item will reset the pending PA1 function.

PA2

PA2 is only valid when the printer is in the NOT READY state and the coax SCS data stream is active. This function displays the "PA2 ENABLED" message when the **Enter** key is pressed and sends a special operator request to the host when the printer is made READY.

NOTE: Selecting the PA2 menu item again ("PA2 DISABLED" appears on the operator panel) or selecting the PA1 menu item will reset the pending PA2 function.

Buffer Reprint

This option is only valid when the printer is in the NOT READY state and the Coax SCS data stream is active. The printer displays the "ENABLED" message when the **Enter** key is pressed, and sends an Intervention Required Status to the host when the printer goes to READY state.

NOTE: Selecting the Buffer Reprint menu item again ("DISABLED" appears on the operator panel) will reset the Buffer Reprint function.

Printer Emulation

This parameter defines the printer emulation, as follows:

- 4234 (the default)
- 3287

After the emulation has been changed, a POR status is sent to the host.

Early Print Complete

Early Print Complete capability allows the printer to send Print Complete status to the host before the printer is actually done printing all data.

- DISABLE (the default) means the printer will suppress the Early Print Complete response until all printing is complete.

- ENABLE means the printer will send an acknowledgement to the host when it is able to accept more data.

NOTE: When an Early Print Complete is enabled and an error occurs, the data in the printer will remain in the buffer (regardless of the setting of the Cancel Buffer option). It is recommended that local procedures be followed to recover from the error.

NOTE: Do not select Early Print Complete while a print job is in progress. If this is done you will need to restart the printer.

Cancel Buffers

CANCEL BUFFERS has the following options:

- ENABLE (the default) cancels all buffers when a job is put on hold from the host or when the **Cancel** key is pressed.
- DISABLE clears the coax internal buffer, not the print engine buffers, when a job is put on hold from the host or when the **Cancel** key is pressed.

Hex Transparent Control

You can enable additional features that are not available in standard IBM emulations. To access these features, send lead–in character text commands in the data stream. You can also use ASCII codes 80 hex through 9F hex as control codes if configured to do so.

Lead–In Characters

The Lead–In Character commands must have a start and end code. Set 1 is the factory default. Three sets (each containing a start and end code) are available:

- Set 1: start code =   <%
          end code   =   >
- Set 2: start code =   ¬ ¬
          end code   = $
- Set 3: start code =   _%
          end code   =   _

Alternate Set 80 – 9F

This selection determines if ASCII codes 80 hex through 9F hex will be used as control codes or printed as standard printable characters.

- Printable (the default) prints the alternate set as standard characters
- Control Code selects the alternate set to be used as printer control codes.

Mono/Dual Case

MONO/DUAL CASE specifies the font as MONO Case or DUAL Case (the default). It is available only in non-SCS mode. The host will be notified of the change when the printer is made READY. If the character set is one of the following 'right to left' sets, MONO CASE prints the same as DUAL CASE: Katakana, Hebrew, Hebrew Old, and Farsi.

SCS (System Network Architecture Character String) Mode is controlled by the host computer. Refer to the *6400 Coax/Twinax Programmer's Reference Manual* for more information about non-SCS mode.

Undefined Character Substitution

UNDEFINED CHARACTER SUBSTITUTION specifies the replacement character to print in place of any unprintable character that is received from the host.

The character code point can range from hex 40 to hex FE. The factory default is set to hex 60.

Print Text Direction

PRINT TEXT DIRECTION specifies the direction in which characters are printed on the page. This allows the printer to print languages which are printed right to left instead of left to right.

- CONTROL BY HOST (the default)
- LEFT TO RIGHT
- RIGHT TO LEFT

The "CONTROL BY HOST" option allows printers configured as a 4234 to use the "SET TEXT ORIENTATION" command from the host.

When a RIGHT TO LEFT language is selected, the host will be notified of print direction changes when the printer is made READY.

Image Buffer Size

IMAGE BUFFER SIZE (screen buffer size) allows you to select the following image buffer sizes:

- 4K (the default)
- 2K

A POR status is sent to the host when the printer is made READY.

Intervention Required

Select from SEND TO HOST or NOT SEND TO HOST (the default).

If SEND TO HOST is selected, the printer sends a signal to the host computer when any of the following occur:

- Printer faults occur.
- Hold mode time-out occurs.

If not selected, the printer will only send the signal on printer faults that cause data loss (paper jam, ribbon stall, online platen open, etc.).

Translate Table

This parameter defines which translate table to use for printing. The following options are available:

- DEFAULT (the default) translates data by using the default table of the current character set.
- DOWNLOADED translates data from EBCDIC to internal code by using the downloaded translate table.

Override Host

OVERRIDE HOST determines whether the printer executes certain commands sent by the host, or continues to use the current settings. The following host commands are ignored when OVERRIDE HOST is enabled: line length, forms length, lines per inch (LPI), characters per inch (CPI), print quality, and text orientation (i.e. left to right). When OVERRIDE HOST is enabled, these settings retain their operator panel settings.

- DISABLE (the default) allows certain host commands (line length, forms length, LPI, CPI, print quality, and text orientation) to override operator panel settings. Note that the information appearing on the message display may *not* match the data stream setting. No values will change upon initial selection of the disable option.
- ENABLE permits operator panel settings to override host data stream commands.

Format Control

FORMAT CONTROL enables the printer to reflect the same spacing as 6408/6412 Model CT0 printers after absolute and relative move commands are executed. The following options are available:

- ENABLE reflects 6408/6412 Model CT0 distance, generated by the Code V feature, IGP feature, and Hex Transparent control code sequence, in the new position (after absolute and relative move commands are executed).
- DISABLE (the default) does not reflect distance, generated by the Code V feature, IGP feature, and Hex Transparent control code sequence, in the new position (after absolute and relative move commands are executed).

Maximum Printable Width

MAXIMUM PRINTABLE WIDTH sets the maximum width of the printer when using a CT host interface.

- 13.2 INCHES (the default)
- 13.6 INCHES

NOTE: The twinax interface menu and coax interface menu option for maximum printable width use the same internal variable. Setting this option in either menu will make it the current setting for the printer, independent of the interface used.

NOTE: Although the LP+ emulation maintains width in characters, the maximum printable width in characters is controlled by the same internal variable that is set by the twinax interface menu and coax interface menu option for maximum printable width option.

C/T Hotport

Gives the printer the ability to handle multiple data streams simultaneously. It allows the printer to service hosts attached to the serial, parallel, and either coax or twinax ports as if they were the only interface connected.

Port Type

Selects the type of port to be used. The Disable selection disables the port from the hotport process. The available selections are:

- Twinax (the default)
- Coax
- Disable

Timeout

This is the value used by the printer to time out from the current port and check the other ports for data to print. When the printer has not received data from the host after the specified period of time, it needs to Timeout in order to service the other ports. The available selections are 10 to 180 seconds. The default is 15 seconds.

Report Status

When this option is enabled, faults are reported even if the fault is not on the current active port. If the option is disabled, a fault on the printer is reported only if it occurs on the active ports.

Hex Print Mode

When enabled, the HEX PRINT MODE parameter prints the EBCDIC data and control codes received from the host as hex values. Refer to page 6–9 to obtain a hex code printout. Disable is the default condition.

NOTE: Printing in Hex Mode may alter print attributes set by the host computer. A power cycle may be required after changing HEX PRINT MODE from enable to disable.

Compatibility Options Menu (Coax Only)

The Compatibility Options menu allows you to select special printer functions in the non-SCS mode, based on the capabilities of the printer emulated.
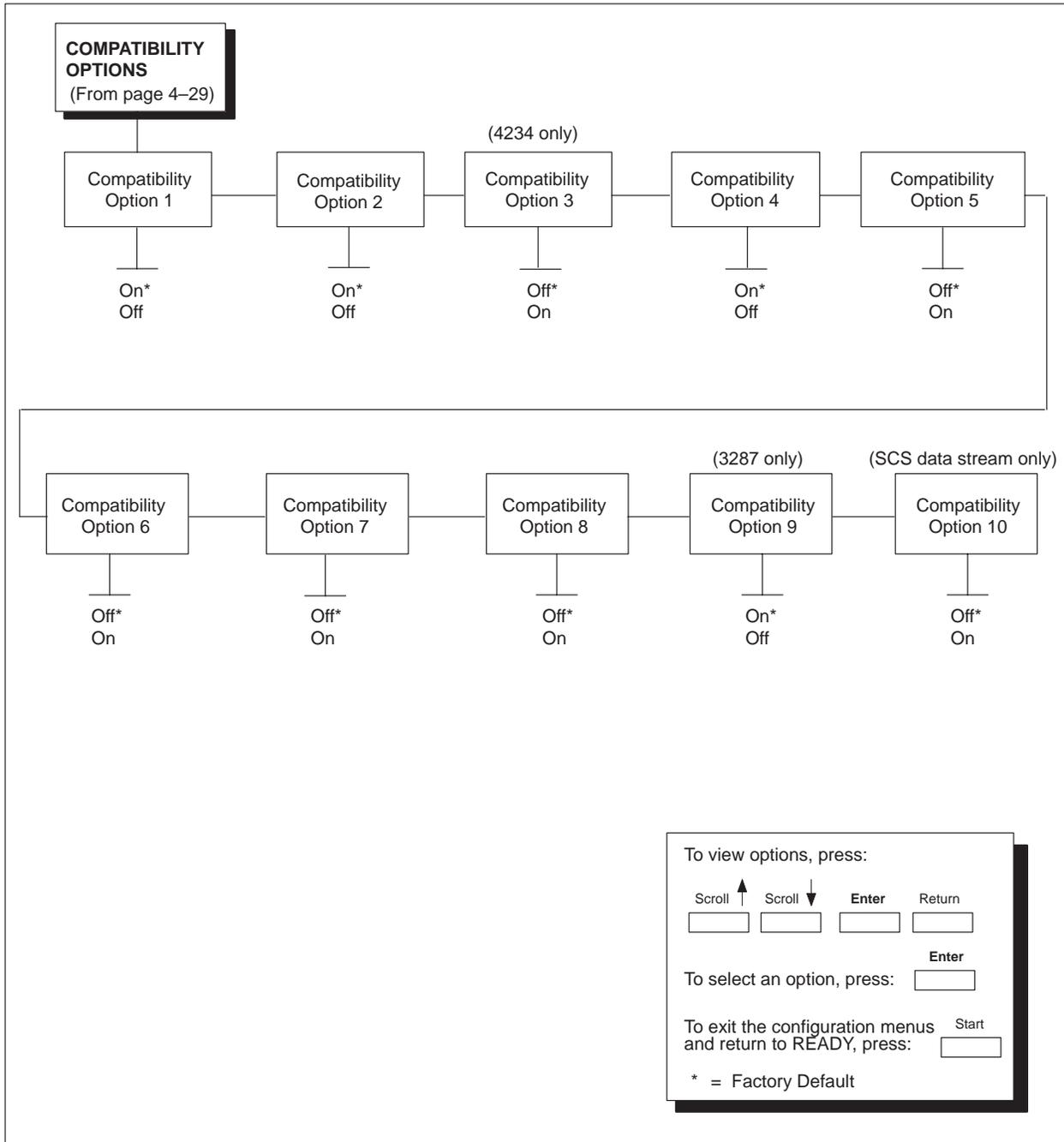
Figure 4–8. Compatibility Options Menu

Compatibility Option 1: Carriage Return at MPP+1

MPP is Maximum Print Position, which is also known as line length.
OPTION 1 controls a carriage return at the end of a print line and at MPP+1.

- ON produces a carriage return to the first print position of the next line.
- OFF (the default) produces a carriage return to the first print position of the current line.

Compatibility Option 2: New Line at MPP+1

NEW LINE AT MPP+1 controls how many lines are skipped when the carriage returns to a new line.

- ON moves to the first print position of the next print line.
- OFF (the default) moves to the first print position two lines down from the current position.

Compatibility Option 3: Position After Form Feed (4234 only)

POSITION AFTER FORM FEED allows you to select the location of the print position after a form feed command is sent.

- OFF sets the printer to print at position 2 of the first print line on the next form.
- ON (the default) sets the printer to print at print position 1 of the first print line on the next form.

Compatibility Option 4: Form Feed at End of Print Buffer

FORM FEED AT END OF PRINT BUFFER determines the print line position when a form feed command is the last code encountered in the print buffer.

- ON moves to the first print position on the second line of the next form.
- OFF (the default) moves to the first print position on the first line of the next form.

NOTE: This option is ignored if Compatibility Option 7 is on.

If configured as a 3287, and a form feed occurs in the middle of a print buffer, the printer defaults to the first print position on the second line of the next form, regardless of the setting of this option.

Compatibility Option 5: Null Suppression

NULL SUPPRESSION will either treat nulls as blank spaces or ignore them. If nulls are ignored, the print position does not move.

- OFF (the default) ignores nulls.
- ON treats nulls as blank spaces.

Compatibility Option 6: Form Feed Command Position

FORM FEED COMMAND POSITION determines if the position of a form feed command affects its execution.

- OFF (the default) normally performs a form feed only if it occurs at the first print position in a line or at Maximum Print Position +1. (The Maximum Print Position is the line length.) A form feed command at any other position is recognized as a blank.
- ON allows the printer to perform a form feed command anywhere in the data stream.

Compatibility Option 7: Automatic Form Feed at End of Print Buffer

AUTOMATIC FORM FEED AT END OF PRINT BUFFER specifies whether or not to perform an automatic form feed at the end of a print buffer.

- OFF (the default) performs an automatic new line command after completing a print buffer (unless a form feed, new line, or carriage return command was the last one executed). The printer is set to print at print position 1 of the next line.
- ON performs an automatic form feed after completing a print buffer (unless a form feed command was the last one in the buffer). The printer is set to print at print position 1 of the first line of the next form.

Compatibility Option 8: Automatic FF After Operator-Initiated Copy

This option determines the print position after an operator-initiated local copy (print screen function).

- OFF (the default) performs an automatic new line command after completing a print buffer (unless a new line, form feed or carriage return command was the last one executed). The printer is set to print at print position 1 of the next line.
- ON performs an automatic form feed command unless a form feed was the last one executed. The printer is set to print at print position 1 of the first line on the next form.

Compatibility Option 9: CR, EM, and NL (3287 only)

CR (Carriage Return), EM (Error Message), and NL (New Line) specify that the printer treat the CR, EM, and NL control codes either as spaces or as control codes.

- ON (the default) treats the CR, EM and NL commands as control codes.
- OFF treats the CR, EM and NL commands as spaces.

Compatibility Option 10: Bottom Margin (SCS data stream only)

Any bottom margin specified or implied by a host command will be overridden, causing the operator panel bottom margin value to be used

- OFF (the default) ignores the operator panel bottom margin value.
- ON forces the bottom margin to the value specified by the operator panel.

NOTE: If Bottom Margin is ON, the operator can enter a bottom margin; the top margin will be forced to zero. If it is OFF, the operator panel bottom margin is forced to zero.

Ethernet Parameters Menu
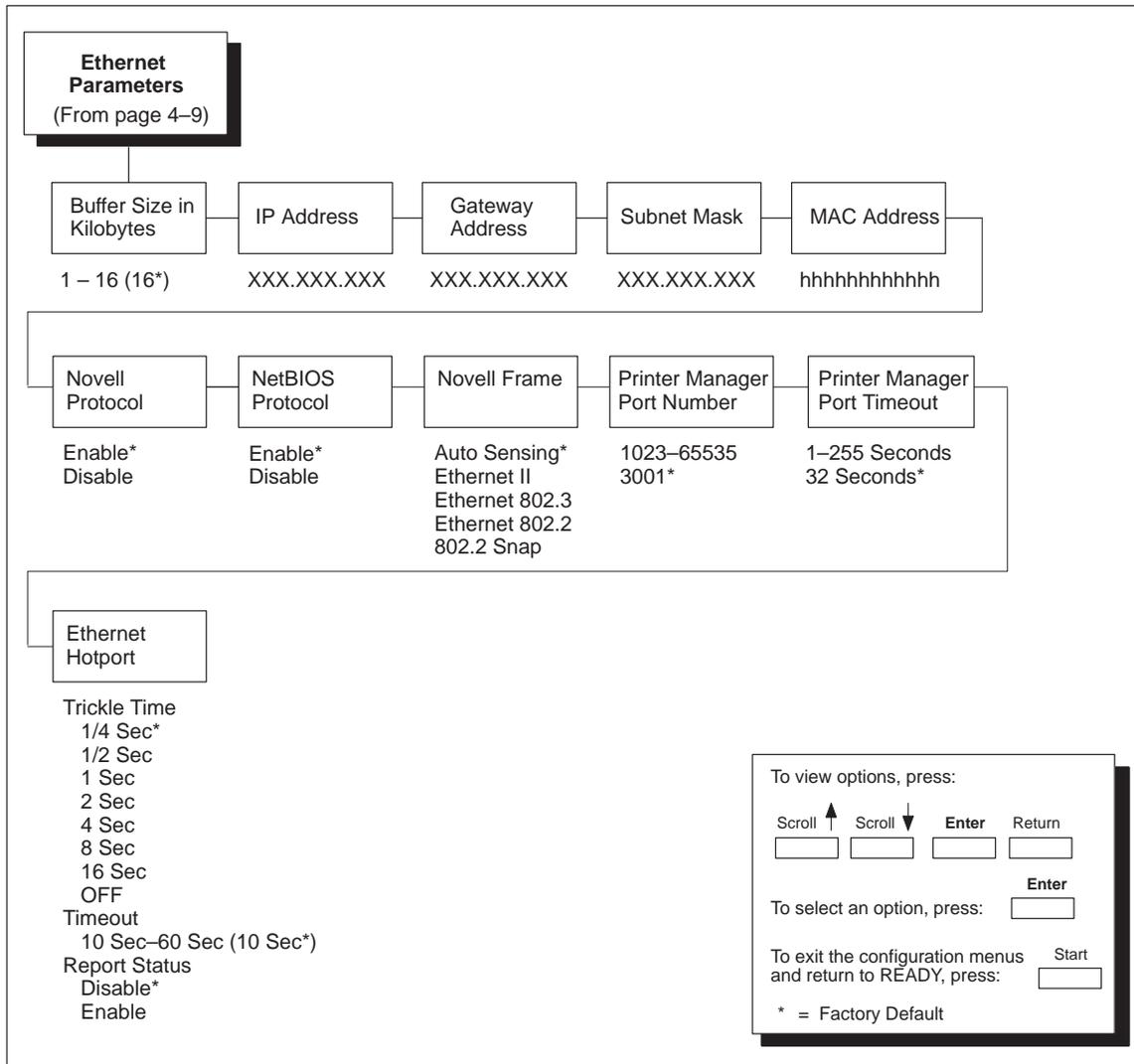
Figure 4–9. Ethernet Parameters Menu

Detailed information regarding the Ethernet IP Address, Gateway Address, Subset Mask, and MAC Address capabilities can be found in the *Ethernet Interface User's Manual.* Access to the parameters is through the operator panel.

Buffer Size in Kilobytes

This parameter determines the size of the input buffer, in 1K increments. A selection of up to 16K is shown. The default of 16K is the forced selection.

Novell Protocol

This option determines whether the Novell protocol will be available. The selections are as indicated below:

- Enable (the default) makes the Novell protocol available with the ethernet installed.

- Disable will make the Novell protocol unavailable during printer operation.

NetBIOS Protocol

This option determines whether the NetBIOS protocol will be available. The selections are as indicated below:

- Enable (the default) makes the NetBIOS protocol available with the ethernet installed.

- Disable will make the NetBIOS protocol unavailable during printer operation.

Novell Frame

This selection determines which framing scheme will be used in processing Novell signals.

- Auto Sensing (the default)
- Ethernet II
- Ethernet 802.3
- Ethernet 802.2
- 802.2 Snap

Printer Manager Port Number

Selects the port to be used by the printer manager. The selectable range is 1023 to 65535, with the default selection of 03001.

Printer Manager Port Timeout

This is the value used by the printer to determine the amount of time before timing out from the printer manager. The selectable range is 1 to 255 Seconds, with the default selection of 32 Seconds.

Ethernet Hotport

Gives the printer the ability to handle multiple data streams simultaneously. It allows the printer to service hosts attached to the serial, ethernet, and either the coax or twinax ports as if they were the only interface connected.

Trickle Time

This functionality prevents an attached host from timing out. In order to support this feature, the port has to be able to accept data from the host and store it for future use. The selected value is the time that the printer waits before getting the next byte of data from the host. Set the value to be less than the host time out value. If the value is too much shorter, the printer fills up its buffer too fast. This function is not applicable for C/T hotport.

Timeout

This is the value used by the printer to time out from the current port and check the other ports for data to print. When the printer has not received data from the host after a certain period of time, it needs to Timeout in order to service the other ports.

Report Status

When this option is enabled, faults are reported even if the fault is not on the current active port. If the option is disabled, a fault on the printer is reported only if it occurs on the active port.

Parallel Interface Menu

More information about these interfaces is in Chapter 5, "Printer Interfaces."

PARALLEL INTERFACE
(From page 4–9)

| Interface Type | PC Parallel | Dataproducts | IEEE1284 | Parallel Hotport |

PC Parallel*
Dataproducts
IEEE 1284
Parallel Hot Port

See page 4–47.

See page 4–50.

Trickle Time
  1/4 Sec*
  1/2 Sec
  1 Sec
  2 Sec
  4 Sec
  8 Sec
  16 Sec
  OFF
Timeout
  10 Sec–60 Sec (10 Sec*)
Report Status
  Disable* – Enable

To view options, press:

Scroll ↑ Scroll ↓ **Enter** Return

To select an option, press: **Enter**

To exit the configuration menus and return to READY, press: Start

* = Factory Default

Figure 4–10. Parallel Interface Menu

Interface Type

The INTERFACE TYPE parameter selects which electrical interface will drive the parallel port interface, as follows:

- PC PARALLEL (the default)
- DATAPRODUCTS
- IEEE 1284
- Parallel Hot Port

IEEE 1284

The IEEE 1284 interface is faster and more versatile than Centronics and supports bidirectional communication. The IEEE 1284 interface has no

parameters that are adjustable via the operator panel. For more information, see Chapter 5, "Printer Interfaces."

Parallel Hotport

Gives the printer the ability to handle multiple data streams simultaneously. It allows the printer to service hosts attached to the serial, parallel, and either the coax or twinax ports as if they were the only interface connected.

Trickle Time

This functionality prevents an attached host from timing out. In order to support this feature, the port has to be able to accept data from the host and store it for future use. The selected value is the time that the printer waits before getting the next byte of data from the host. Set the value to be less than the host time out value. If the value is too much shorter, the printer fills up its buffer too fast. This function is not applicable for C/T hotport.

Timeout

This is the value used by the printer to time out from the current port and check the other ports for data to print. When the printer has not received data from the host after a certain period of time, it needs to Timeout in order to service the other ports.

Report Status

When this option is enabled, faults are reported even if the fault is not on the current active port. If the option is disabled, a fault on the printer is reported only if it occurs on the active port.

PC Parallel Menu

The PC PARALLEL menu configures the electrical signals to operate as a PC Parallel printer.
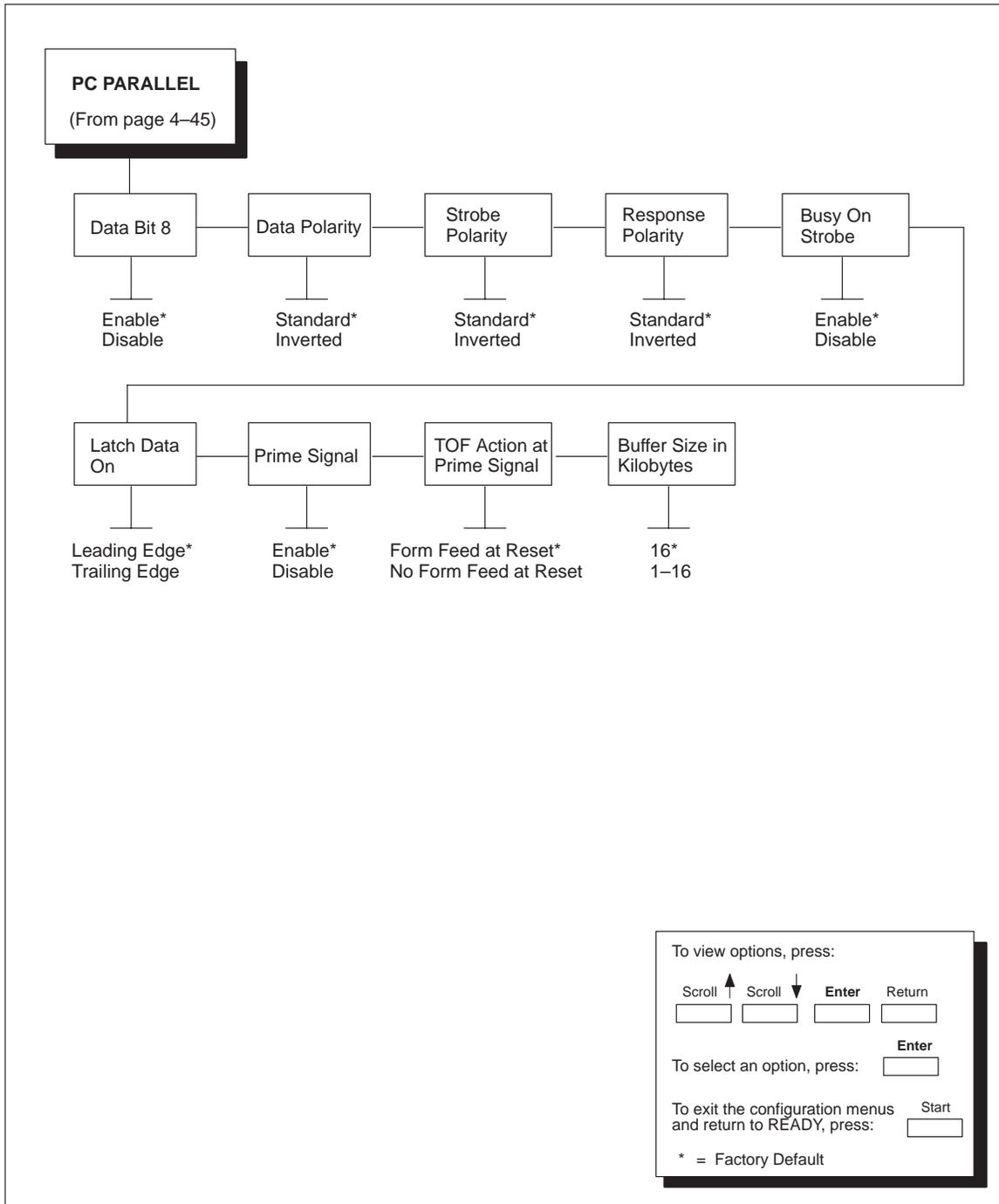
Figure 4–11. PC Parallel Menu

Data Bit 8

The DATA BIT 8 parameter allows access to the extended ASCII character set. This parameter is enabled by default. When this parameter is disabled, the printer interprets bit 8 of each incoming data character as a zero, regardless of its actual setting.

The extended ASCII character set is shown in the *6400 ASCII Programmer's Reference Manual.*

Data Polarity

The DATA POLARITY parameter must be set to match the data polarity of your host computer.

- STANDARD (the default) does not expect the host computer to invert the data.
- INVERTED expects the host computer to invert the data received on the data lines. Ones become zeros, and vice-versa.

Strobe Polarity

The STROBE POLARITY must be set to match the data strobe polarity of your host computer. When the host computer sends a data strobe signal to the printer, this enables the printer to read the data bus.

- STANDARD (the default) does not expect the data strobe signal to be inverted.
- INVERTED expects the host computer to invert the data strobe signal.

Response Polarity

The RESPONSE POLARITY parameter must be set to match the response polarity of your host computer.

- STANDARD (the default) does not invert the response signal.
- INVERTED inverts the response signal sent to the host computer.

Busy on Strobe

BUSY ON STROBE determines when the Busy signal is asserted.

- ENABLE (the default) asserts a busy signal after each character is received.
- DISABLE asserts a busy signal only when the print buffers are full.

Latch Data On

The LATCH DATA ON parameter specifies whether the data is read on the leading or trailing edge of the data strobe signal.

- LEADING EDGE (the default)
- TRAILING EDGE

Prime Signal

- ENABLE (the default). When set and the host asserts the PRIME SIGNAL, the parallel port will perform a warm start.
- DISABLE. The parallel port will not perform a warm start when the host asserts the PRIME SIGNAL.

TOF Action at Prime Signal

TOF (Top-of-Form) ACTION AT PRIME SIGNAL determines whether or not a form feed is performed before a warm start when the prime signal is asserted from the host. This setting is only used if PRIME SIGNAL parameter is enabled.

- FORM FEED AT RESET (the default)
- NO FORM FEED AT RESET

Buffer Size in Kilobytes

This parameter determines the size of the input buffer, in 1K increments. Up to 16K are available. 16K is the default.

Dataproducts Menu

The Dataproducts parallel interface is configured using the following configuration options.
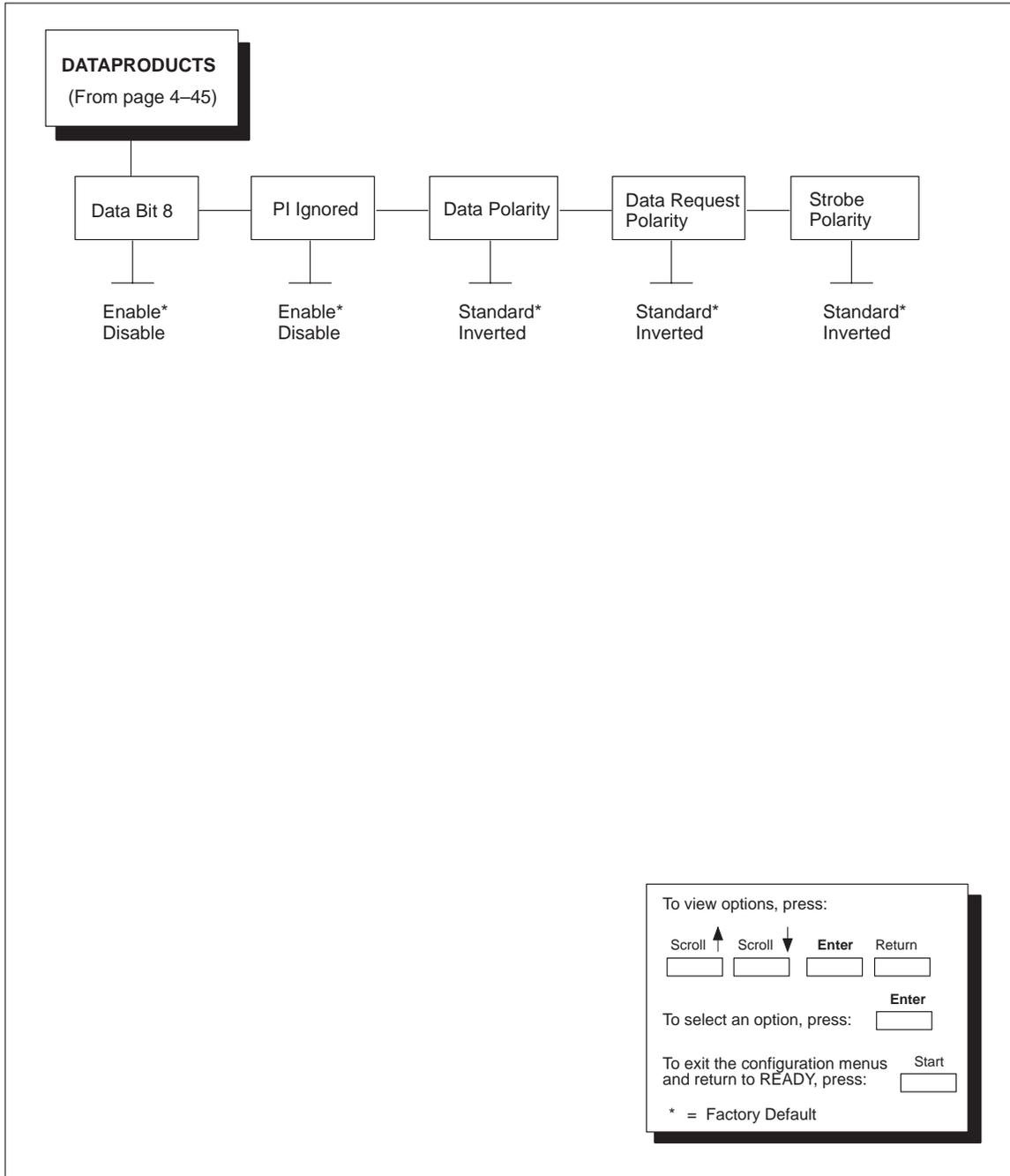
Figure 4–12. Dataproducts Menu

Data Bit 8

The DATA BIT 8 parameter allows access to the extended ASCII character set. This parameter is enabled by default. When this parameter is disabled, the printer interprets bit 8 of each incoming data character as a zero, regardless of its actual setting.

PI Ignored

The PI (Paper Instruction) signal is used to control vertical paper motion.

- ENABLE (the default) ignores the PI signal and treats the the data as characters or control codes.
- DISABLE causes the printer to interpret the eight data lines as VFU commands when the PI signal is true.

Data Polarity

The DATA POLARITY parameter must be set to match the data polarity of your host computer.

- STANDARD (the default) does not expect the host computer to invert the data.
- INVERTED expects the host computer to invert the data received on the data lines. Ones become zeros, and vice-versa.

Data Request Polarity

The DATA REQUEST POLARITY parameter must be set to match the data request polarity of your host computer.

- STANDARD (the default) does not invert the request signal.
- INVERTED inverts the request signal sent to the host computer.

Strobe Polarity

The STROBE POLARITY must be set to match the data strobe polarity of your host computer. When the host computer sends a data strobe signal to the printer, this enables the printer to read the data bus.

- STANDARD (the default) does not expect the data strobe signal to be inverted.
- INVERTED expects the host computer to invert the data strobe signal.

IEEE 1284

The IEEE 1284 interface has no parameters that are adjustable via the operator panel. For more information, see Chapter 5, "Printer Interfaces."

Serial Interface Menu

IMPORTANT

The serial parameters in the printer must be set to match the serial interface in the host computer (at the other end of the printer data cable). Otherwise, the printer may not operate correctly, and data characters from the computer may not print or may appear as "garbled" text.
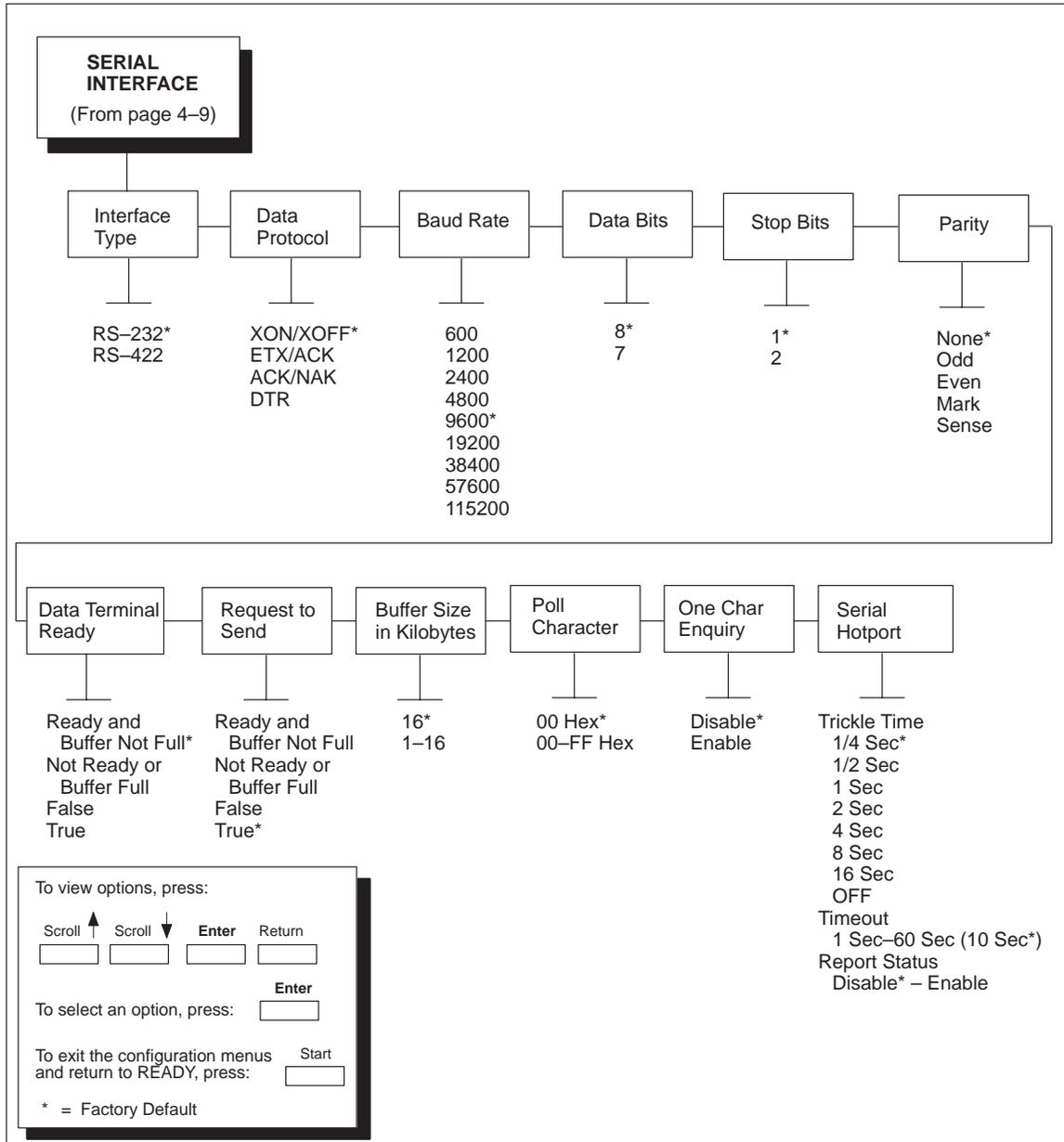
Figure 4–13. Serial Interface Menu

Interface Type

This parameter configures the electrical interface for the serial port, as follows:

- RS–232 (the default)
- RS–422

Data Protocol

You may select one of the following serial interface protocols to meet the host interface requirements.

- XON / XOFF (the default) — Transmit On / Transmit Off. The printer controls the flow of communication from the host by telling the host to turn the transmission on and off. This is the factory default serial protocol.

- ETX / ACK — End of Text / Acknowledge. The host controls the flow of communication to the printer by sending a block of data and ending the block with an End of Text (ETX) signal. When the printer receives the ETX signal, it will acknowledge it has received the entire block of data.

- ACK / NAK — Acknowledge / Negative Acknowledge. ACK means acknowledge; the device acknowledges it has accepted a transmission. NAK means a negative acknowledge; the device did not receive the transmission.

- DTR — (DTE Ready). The printer controls the data flow by asserting or de–asserting this hardware signal to the host. If there is enough room in the printer buffer, the printer will send a high signal; if the buffer is full the printer will send a low signal. DTR tells the host if it is safe to send more data. (If the host sends data during an unsafe condition, data will be lost.)

Baud Rate

This parameter sets the baud rate of the serial interface in the printer. Baud rate is the speed at which serial data is transferred between the host computer and the printer.

- 600 BAUD
- 1200 BAUD

- 2400 BAUD
- 4800 BAUD
- 9600 BAUD (the default)
- 19200 BAUD
- 38400 BAUD
- 57600 BAUD
- 115200 BAUD

Data Bits

The DATA BITS parameter sets the length of the serial data word. The length of the data word must match the corresponding data bits setting in the host computer.

- 8 BITS (the default)
- 7 BITS

Stop Bits

The STOP BITS parameter sets the number of stop bits in the serial data word. The setting must match the corresponding stop bit setting in the host computer. One (1, the default) or two (2) stop bits can be selected.

Parity

The PARITY parameter setting can be set for the following:

- NONE (the default)
- ODD
- EVEN
- MARK
- SENSE

The setting must match the corresponding parity setting in the host computer.

Data Terminal Ready

This configuration is part of hardware flow control and determines when the DATA TERMINAL READY (DTR) signal is generated. This signal indicates whether or not the printer is ready to receive data.

- READY AND BUFFER NOT FULL (the default) asserts the DTR signal when the printer is READY and the internal serial buffer is not full.
- NOT READY OR BUFFER FULL asserts the DTR signal when the printer is NOT READY or the internal serial buffer is full.

- FALSE never asserts the DTR signal.
- TRUE continuously asserts the DTR signal.

NOTE: When the printer is attached to an AS/400 or RISC 6000, the DTR should be set to TRUE.

Request to Send

This configuration is part of hardware flow control and determines when the REQUEST TO SEND (RTS) signal is generated. This signal indicates whether or not the printer is ready to receive data.

- READY AND BUFFER NOT FULL asserts the RTS signal when the printer is READY and the internal serial buffer is not full.
- NOT READY OR BUFFER FULL asserts the RTS signal when the printer is NOT READY or the internal serial buffer is full.
- FALSE never asserts the RTS signal.
- TRUE (the default) continuously asserts the RTS signal.

NOTE: Xon/Xoff is always on. See page 5–5 for more information.

Buffer Size in Kilobytes

This parameter determines the size of the input buffer, in 1K increments. Up to 16K are available. 16K is the default.

Poll Character

This option is used when One Char Enquiry is enabled and the IGP feature is available. Whenever the printer receives this character, it sends a response to the host indicating the current state of the printer. It may be configured from 00 through FF Hex. The default value is 00.

One Char Enquiry

When enabled, and the IGP feature is available, a status byte is sent back to the host when the poll character or the command SFCC enquiry is sent to the printer (serial interface only). The poll character is received and the status

byte is sent whether the printer is online or offline. The SFCC enquiry will only be processed when the printer is online.

The status byte sent to the host is defined as follows:

BIT	USE
7,6	0
5	1
4	0
3	1 = printer fault
2	1 = IGP busy
1	0 = offline, 1 = online
0	1 = serial input buffer exceeds xoff/on

Serial Hotport

Gives the printer the ability to handle multiple data streams simultaneously. It allows the printer to service hosts attached to the serial, parallel, and either coax or twinax ports as if they were the only interface connected.

Trickle Time

This functionality prevents an attached host from timing out. In order to support this feature, the port has to be able to accept data from the host and store it for future use. The selected value is the time that the printer waits before getting the next byte of data from the host. Set the value to be less than the host time out value. If the value is too much shorter, the printer fills up its buffer too fast. This function is not applicable for C/T hotport.

Timeout

This is the value used by the printer to time out from the current port and check the other ports for data to print. When the printer has not received data from the host after a certain period of time, it needs to Timeout in order to service the other ports.

Report Status

When this option is enabled, faults are reported even if the fault is not on the current active port. If the option is disabled, a fault on the printer is reported only if it occurs on the active port.

Emulation Configuration Menu
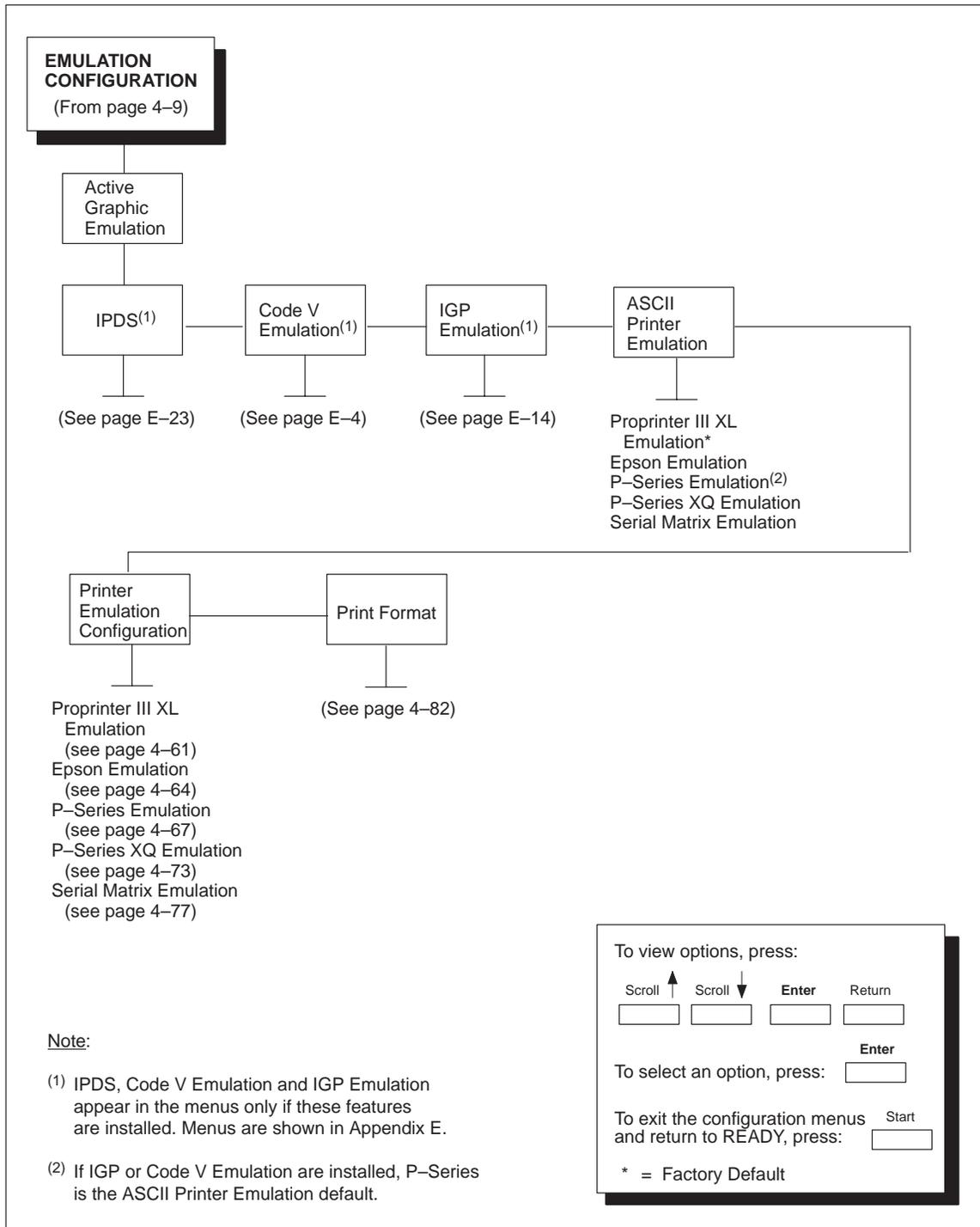
Figure 4–14. Emulation Configuration Menu

Your printer can support many emulations: Proprinter III XL, Epson, P–Series, P–Series XQ, and Serial Matrix. These emulations are included with your printer.

Your printer can support other emulations: IPDS, Code V, and IGP. These emulations are features that must be ordered separately. (These features may have been installed at the factory if the features were ordered with the printer.) For the IPDS Coax/Twinax emulation, the IBM Coax/Twinax feature must be installed.

All the emulations contain the same configuration submenus shown on page 4–9. The "EMULATION CONFIGURATION" submenu, however, is unique for each emulation; refer to Appendix E for optional emulation feature configuration menus.

For more information on these features, refer to the documentation shipped with the feature or to the "Related Documents" section that begins on page 1–3.

ASCII Printer Emulation

This parameter selects one of the following ASCII printer emulations as the active emulation:

- PROPRINTER III XL EMULATION (the default)
- EPSON EMULATION
- P–SERIES EMULATION
- P–SERIES XQ EMULATION
- SERIAL MATRIX EMULATION

The configuration for the active emulation is selected from the Printer Emulation Configuration menu, described on pages 4–61 through 4–63.

Printer Emulation Configuration

This parameter configures the ASCII printer emulation and page formatting. The submenus (further described on pages 4–61 through 4–63) are as follows:

- PROPRINTER III XL EMULATION
- EPSON EMULATION
- P–SERIES EMULATION
- P–SERIES XQ EMULATION
- SERIAL MATRIX EMULATION

Print Format

This parameter configures page formatting. The submenus are described beginning on page 4–82.

Proprinter III XL Emulation Menu

```
PROPRINTER III XL
EMULATION
(From page 4–58)
```

Print Language	Alternate Character Set	Define CR Code	Auto LF

	Define LF Code	FF Valid at TOF	20 CPI Condensed

Print Language:

0437   PC Character Set*
0737   Greek
0813   Greek
0819   ISO/ANSI Multilingual
0850   PC Multilingual
0851   Greek Old
0852   Latin 2/Roece
0853   Latin 3 PC
0855   Cyrillic
0857   Turkish
0858   PC Euro Multilingual
0860   Portuguese
0861   Icelandic
0862   Hebrew
0863   Canadian French
0864   Arabic
0865   Danish/Norwegian
0866   Cyrillic
0869   Greek New
0874   Thai
0876   OCR A
0877   OCR B
0912   ISO Latin 2 PC
0913   ISO Latin 3
0914   ISO Latin 4
0915   ISO Cyrillic PC
0916   Hebrew
0920   ISO Latin 5 Turkish
0921   ISO Baltic Multilingual
0922   Estonian
0923   Latin 9 8859–15
1006   ISO URDU
1008   ISO Arabic
1046   Arabic Extended
1089   ISO Arabic
1098   Farsi 1285
1116   Estonian
1117   Latvian
1118   Lithuanian
1129   Vietnamese
1134   Hebrew Old

Alternate Character Set:
PC Character Set 1*
PC Character Set 2

Define CR Code:
CR = CR*
CR = CR + LF

Auto LF:
Enable*
Disable

Define LF Code:
LF = LF*
LF = CR + LF

FF Valid at TOF:
Enable*
Disable

20 CPI Condensed:
Enable*
Disable

To view options, press:

Scroll ↑   Scroll ↓   **Enter**   Return

To select an option, press: **Enter**

To exit the configuration menus and return to READY, press: Start

* = Factory Default

Figure 4–15. Proprinter III XL Emulation Menu

Print Language

This parameter selects a print language for the Proprinter III XL emulation. Each PRINT LANGUAGE selection supports a different foreign language character set. A host data stream command that changes the print language overrides the print language that is specified via the operator panel. Note that when 0876 OCR A or 0877 OCR B is selected as the print language, the print quality is changed to OCR A or OCR B, respectively. See the *6400 ASCII Programmer's Reference Manual* for more information on character sets.

Alternate Character Set

This parameter determines if the characters in the hex 80 through hex 9F range are printable characters or control codes.

- PC Character Set 1 = control codes (the default).
- PC Character Set 2 = printable characters.

Define CR Code

The DEFINE CR CODE (Define Carriage Return Code) option controls the action of the printer when it receives a Carriage Return code (ØD hex) from the host computer. If this feature is enabled, each time the printer receives a Carriage Return, it inserts an additional Line Feed code (ØA hex) into the data stream. Do not use this feature if the host computer sends Line Feeds to the printer.

- CR = CR is the default.
- CR = CR + LF inserts an extra Line Feed after each Carriage Return.

Auto LF

The AUTO LF (Auto Line Feed) option defines the printer actions when print data is received past the forms width setting.

- ENABLE (the default) performs an automatic carriage return and line feed when data is received past the forms width.
- DISABLE discards any data past the forms width.

Define LF Code

The DEFINE LF CODE (Define Line Feed Code) option controls the action of the printer when it receives a Line Feed code (ØA hex) from the host computer. If this feature is enabled, each time the printer receives a Line Feed, it inserts an additional Carriage Return code (ØD hex) into the data stream. This feature can be used in most installations, but it is required if the host computer does not send Carriage Returns to the printer.

- LF = LF (the default) produces a Line Feed.
- LF = CR + LF adds an extra Carriage Return with each Line Feed.

FF Valid at TOF

The FF VALID AT TOF (Form Feed Valid at Top of Form) option determines whether the printer will perform a Form Feed when the host sends a Form Feed command, if the printer is at the Top of Form. The printer will perform a Form Feed when the operator panel **Form Feed** key is pressed, regardless of this option setting.

- ENABLE (the default) performs a form feed when the host sends a Form Feed command and the printer is at the top of form.
- DISABLE will not perform a form feed when the host sends a Form Feed command and the printer is at the Top of Form.

20 CPI Condensed

When the 20 CPI CONDENSED (20 Characters Per Inch Condensed) option is enabled, and compressed print is chosen by the host computer, the printer prints characters that are about 60 percent of the width of normal characters. For example, a 12 CPI Draft font will compress to 20 CPI. This is helpful for applications where you need to print the maximum amount of information on a page.

- ENABLE (the default) prints narrow characters when compressed print is chosen by the host computer.
- DISABLE will not compress the character widths, even if condensed print is chosen by the host.

Epson Emulation Menu

```
EPSON EMULATION
(From page 4–58)
```

Character Sets	Epson Print Language	Define CR Code	Auto LF	Define LF Code

| | | CR = CR* | Enable* | LF = LF* |
| | | CR = CR + LF | Disable | LF = CR + LF |

Epson Set*   ASCII (USA)*
OCR A   French
OCR B   German
0437 PC Character Set   English (UK)
0737 Greek   Danish I
0813 Greek   Swedish
0819 ISO/ANSI   Italian
      Multilingual   Spanish I
0850 PC Multilingual Japanese
0851 Greek Old   Norwegian
0852 Latin 2/ROECE   Danish II
0853 Latin 3 PC   Spanish II
0855 Cyrillic   Latin American I
0857 Turkish   French Canadian
0858 PC Euro Multilingual Latin American II
0860 Portuguese
0861 Icelandic
0862 Hebrew
0863 Canadian French
0864 Arabic
0865 Danish/Norwegian
0866 Cyrillic
0869 Greek New
0874 Thai
0912 ISO Latin 2 PC
0913 ISO Latin 3
0914 ISO Latin 4
0915 ISO Cyrillic PC
0916 Hebrew
0920 ISO Latin 5 Turkish
0921 ISO Baltic Multilingual
0922 Estonian
0923 Latin 9 8859–15
1006 ISO URDU
1008 ISO Arabic
1046 Arabic Extended
1089 ISO Arabic
1098 Farsi 1285
1116 Estonian
1117 Latvian
1118 Lithuanian
1129 Vietnamese
1134 Hebrew Old

Printer Select	20 CPI Condensed

| Disable* | Enable* |
| Enable | Disable |

```
To view options, press:

Scroll ↑   Scroll ↓   Enter   Return
[____]     [____]     [____]  [____]

                              Enter
To select an option, press:   [____]

To exit the configuration menus   Start
and return to READY, press:       [____]

*  =  Factory Default
```

Figure 4–16. Epson Emulation Menu

Character Sets

This parameter selects a character set for the Epson emulation. Note that when OCR A or OCR B is selected as the print language, the print quality is changed to OCR A or OCR B, respectively. See the *6400 ASCII Programmer's Reference Manual* for more information on character sets.

Epson Print Language

This parameter selects a print language for the Epson emulation. Each print language selection supports a different foreign language character set. A host data stream command that changes the print language overrides the print language that is specified via the operator panel.

Define CR Code

The DEFINE CR CODE (Define Carriage Return Code) option controls the action of the printer when it receives a Carriage Return code (ØD hex) from the host computer. If this feature is enabled, each time the printer receives a Carriage Return, it inserts an additional Line Feed code (ØA hex) into the data stream. Do not use this feature if the host computer sends Line Feeds to the printer.

- CR = CR (the default) does not insert an extra Line Feed after each Carriage Return.
- CR = CR + LF inserts an extra Line Feed after each Carriage Return.

Auto LF

The AUTO LF (Auto Line Feed) option defines the printer actions when print data is received past the forms width setting.

- ENABLE (the default) performs an automatic carriage return and line feed when data is received past the forms width.
- DISABLE discards any data past the forms width.

Define LF Code

The DEFINE LF CODE (Define Line Feed Code) option controls the action of the printer when it receives a Line Feed code (ØA hex) from the host computer. If this feature is enabled, each time the printer receives a Line Feed, it inserts an additional Carriage Return code (ØD hex) into the data stream. This feature can be used in most installations, but it is required if the host computer does not send Carriage Returns to the printer.

- LF = LF (the default) does not add a Carriage Return with a Line Feed.
- LF = CR + LF adds an extra Carriage Return with each Line Feed.

Printer Select

This option determines if the ASCII DC1 and DC3 control codes can be used to disable and enable the printer.

- DISABLE (the default) ignores the DC1 and DC3 control codes.
- ENABLE disables the printer when a DC1 control code is received, and enables the printer when a DC3 control code is received.

20 CPI Condensed

When the 20 CPI CONDENSED (20 Characters Per Inch Condensed) option is enabled, and compressed print is chosen by the host computer, the printer prints characters that are about 60 percent of the width of normal characters. For example, a 12 CPI Draft font will compress to 20 CPI. This is helpful for applications where you need to print the maximum amount of information on a page.

- ENABLE (the default) prints narrow characters when compressed print is chosen by the host computer.
- DISABLE will not compress the character widths, even if condensed print is chosen by the host.

P–Series Emulation Menu
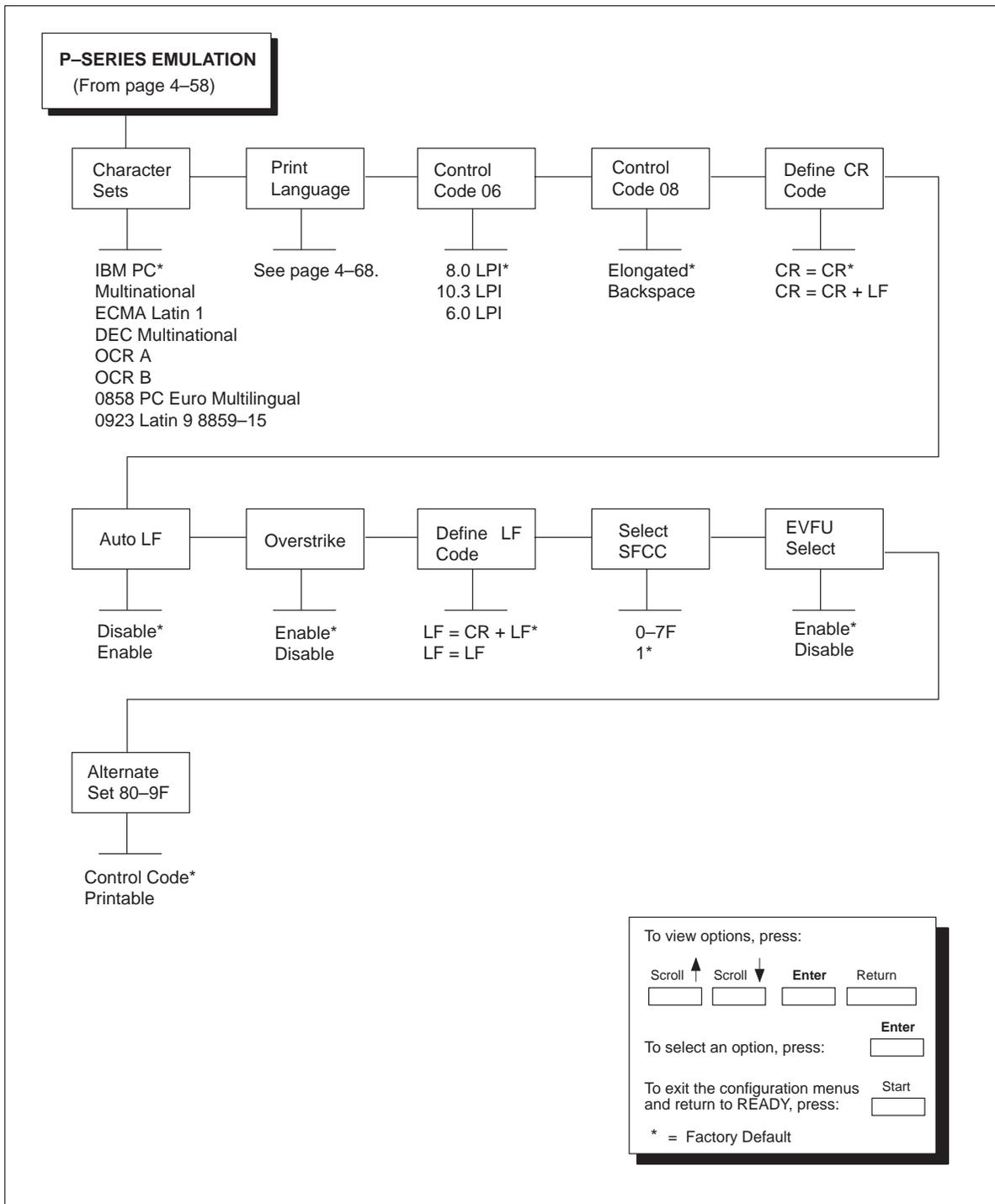
Figure 4–17. P–Series Emulation Menu

(Continued from the P–Series Emulation Menu)

PRINT LANGUAGE
(From page 4–67)

| IBM PC | Multinational | ECMA Latin 1 | DEC Multinational |

Multinational:
ASCII (USA)*
EBCDIC

DEC Multinational:
ASCII (USA)*
French
German
English (UK)
Norwegian/Danish
Swedish
Italian
Spanish
Japanese
French Canadian
Dutch
Finnish
Swiss

Select Subset
Primary

Select Subset
Extended

Select Subset
Primary

Select Subset
Extended

IBM PC — Select Subset Primary:
ASCII (USA)*
French
German
English (UK)
Danish
Swedish
Italian
Spanish
Japanese
French Canadian
Latin American
Danish II
Spanish II
Latin American II

IBM PC — Select Subset Extended:
0437 PC Character Set*
0850 PC Multilingual

ECMA Latin 1 — Select Subset Primary:
ASCII (USA)*
German
Swedish
Danish
Norwegian
Finnish
English (UK)
Dutch
French
Spanish
Italian
Turkish
Japanese

ECMA Latin 1 — Select Subset Extended:
Multinational*
Barcode 10 CPI
Multinational DP 10 CPI
Multinational DP 12 CPI
Multinational NLQ 10 CPI
Greek DP 10 CPI
Greek DP 12 CPI
Greek NLQ 10 CPI
Graphic DP 10 CPI
Graphic NLQ 10 CPI
Scientific DP 10 CPI
Scientific DP 12 CPI
Scientific NLQ 10 CPI

To view options, press:

Scroll ↑   Scroll ↓   **Enter**   Return

Enter

To select an option, press:

To exit the configuration menus
and return to READY, press: Start

* = Factory Default

Figure 4–18. P–Series Print Language Menu

Character Sets

This parameter selects a character set for the P–Series emulation. Once you have selected a character set, you must also define a print language for that character set, described under the PRINT LANGUAGE option.

- IBM PC (the default)
- MULTINATIONAL
- ECMA LATIN 1
- DEC MULTINATIONAL
- OCR A
- OCR B
- 0858 PC EURO MULTILINGUAL
- 0923 LATIN 9 8859–15

NOTE: See the *6400 ASCII Programmer's Reference Manual* for information on character sets.

Print Language

If you selected one of the character sets other than OCR A/OCR B, 0858, or 0923 (which have only one available print language), you must also select a print language for that character set. The print languages available for each character set are shown in Figure 4–18 on page 4–68. The default print language for each character set follows:

- IBM PC: Default for Select Subset Primary is ASCII (USA).
  Default for Select Subset Extended is 0437 PC Character Set.
- MULTINATIONAL: Default is ASCII (USA).
- ECMA LATIN 1:   Default for Select Subset Primary is ASCII (USA).
  Default for Select Subset Extended is MULTINATIONAL.
- DEC MULTINATIONAL: Default is ASCII (USA).

Control Code 06

This option will select alternate line spacing. When the printer receives a hex 06 command, the line spacing will change to spacing specified in this option for the current line only.

- 8.0 LPI (the default)
- 10.3 LPI
- 6.0 LPI

Control Code 08

This option determines the action to take when a hex 08 command is received.

- ELONGATED (the default) prints double high characters for the current line.
- BACKSPACE moves the current print position one space to the left unless the printer is currently at print position 1.

Define CR Code

The DEFINE CR CODE (Define Carriage Return Code) option controls the action of the printer when it receives a Carriage Return code (ØD hex) from the host computer. If this feature is enabled, each time the printer receives a Carriage Return, it inserts an additional Line Feed code (ØA hex) into the data stream. Do not use this feature if the host computer sends Line Feeds to the printer.

- CR = CR (the default) does not insert an extra Line Feed after each Carriage Return.
- CR = CR + LF inserts an extra Line Feed after each Carriage Return. The next print position will be print position 1 of the next line.

Auto LF

The AUTO LF (Auto Line Feed) option defines the printer actions when print data is received past the forms width setting.

- DISABLE (the default) discards any data past the forms width.
- ENABLE performs an automatic carriage return and line feed when data is received past the forms width.

Overstrike

The OVERSTRIKE option determines the action required when a line is printed over a previous line because a carriage return was received without a line feed.

- ENABLE (the default) prints the second line on top of the first line.
- DISABLE replaces the characters from the first line with the second line.

Define LF Code

The DEFINE LF CODE (Define Line Feed Code) option determines whether an automatic carriage return should occur whenever a line feed command is received.

- LF = CR + LF (the default) forces an automatic carriage return with each line feed command. The next print position will be position 1 of the next line.
- LF = LF does not perform an automatic carriage return. The next print position will be the current print position of the next line.

Select SFCC

The SELECT SFCC option determines what hex code to use as the Special Function Control Character (SFCC). When a printer control code consists of more than one character, it is called a command sequence. The SFCC alerts the printer that a command sequence is next and not a printable character. The option SFCC can range from 0 through 7F. The factory default value is 1. See the *6400 ASCII Programmer's Reference Manual* for more information.

EVFU Select

The EVFU SELECT (Electronic Vertical Format Unit Select) option determines if EVFU skips can be defined. An EVFU skip is an instruction to move the paper to a specific location on a form. See the *6400 ASCII Programmer's Reference Manual* for more information.

- ENABLE (the default) defines EVFU skips.
- DISABLE does not define EVFU skips.

Alternate Set 80–9F

This option determines if data in the range of hex 80 through hex 9F should be interpreted as a control code or as a printable character.

- CONTROL CODE (the default) interprets data in the range of hex 80 through hex 9F as a control code.
- PRINTABLE prints data in the range of hex 80 through hex 9F.

P–Series XQ Emulation Menu

P–SERIES XQ EMULATION
(From page 4–58)

Control Code 06	Define CR Code	Auto LF	Define LF Code	Compressed Print
8.0 LPI* 10.3 LPI 6.0 LPI	CR = CR* CR = CR + LF	Disable* Enable	LF = CR + LF* LF = LF	Char 01 SOH* Char 03 ETX Char 09 HT

Elong/Alt. Font	High Speed Print Mode	EVFU Select	Upper Case Select	Slew Relative
ELNG=BS FONT=SO* ELNG=SO FONT=BS	Char 02 STX* Char 03 ETX Char 09 HT	Enable* Disable	Disable* Enable	1–16 Lines* 1–15 Lines

To view options, press:

Scroll ↑   Scroll ↓   **Enter**   Return

To select an option, press: **Enter**

To exit the configuration menus and return to READY, press: Start

* = Factory Default

Figure 4–19. P–Series XQ Emulation Menu

Control Code 06

This option will select alternate line spacing. When the printer receives a hex 06 command, the line spacing will change to spacing specified in this option for the current line only.

- 8.0 LPI (the default)
- 10.3 LPI
- 6.0 LPI

Define CR Code

The DEFINE CR CODE (Define Carriage Return Code) option controls the action of the printer when it receives a Carriage Return code (ØD hex) from the host computer. If this feature is enabled, each time the printer receives a Carriage Return, it inserts an additional Line Feed code (ØA hex) into the data stream. Do not use this feature if the host computer sends Line Feeds to the printer.

- CR = CR (the default) does not insert an extra Line Feed after each Carriage Return.
- CR = CR + LF inserts an extra Line Feed after each Carriage Return. The next print position will be print position 1 of the next line.

Auto LF

The AUTO LF (Auto Line Feed) option defines the printer actions when print data is received past the forms width setting.

- DISABLE (the default) discards any data past the forms width.
- ENABLE performs an automatic carriage return and line feed when data is received past the forms width.

Define LF Code

The DEFINE LF CODE (Define Line Feed Code) option determines whether an automatic carriage return should occur whenever a line feed command is received.

- LF = CR + LF (the default) forces an automatic carriage return with each line feed command. The next print position will be position 1 of the next line.
- LF = LF does not perform an automatic carriage return. The next print position will be the current print position of the next line.

Compressed Print

The COMPRESSED PRINT option controls which host command sets compressed printing.

- CHAR 01 SOH (the default)
- CHAR 03 ETX
- CHAR 09 HT

Elong/Alt. Font

The ELONG/ALT. FONT (Elongated/Alternate Font) option determines which host command selects elongated (double high) fonts and extended character set.

- ELNG=BS FONT=SO (the default) specifies that the ASCII BS command (hex 08) selects elongated fonts and the ASCII SO command (hex 0E) selects alternate font.
- ELNG=SO FONT=BS specifies that the ASCII SO command (hex 0E) selects elongated fonts and the ASCII BS command (hex 08) selects alternate font.

High Speed Print Mode

The HIGH SPEED PRINT MODE option determines which host command selects high speed printing.

- CHAR 02 STX (the default)
- CHAR 03 ETX
- CHAR 09 HT

EVFU Select

The EVFU SELECT (Electronic Vertical Format Unit Select) option determines if EVFU skips can be defined. An EVFU skip is an instruction to move the paper to a specific location on a form. See the *6400 ASCII Programmer's Reference Manual* for more information.

- ENABLE (the default) defines EVFU skips.
- DISABLE does not define EVFU skips.

Upper Case Select

The UPPER CASE SELECT option controls how the printer handles lowercase characters it receives from the host computer. When enabled, all characters will be printed in uppercase.

- DISABLE (the default) prints lowercase characters received from the host computer as lowercase, and uppercase characters received from the computer as uppercase.
- ENABLE prints lowercase characters received from the host computer as their corresponding uppercase equivalents; uppercase characters received from the computer are printed as uppercase.

Slew Relative

The SLEW RELATIVE option determines the number of lines slewed (the number of lines the form is advanced to a preset location) when an EVFU Slew Relative command is received.

For further information, refer to the EVFU information in the *6400 ASCII Programmer's Reference Manual.*

- 1–16 LINES (the default)
- 1–15 LINES

Serial Matrix Emulation Menu

```
┌─────────────────────────────┐
│ SERIAL MATRIX EMULATION     │
│    (From page 4–58)         │
└─────────────────────────────┘
         │
    ┌────┼────────┬────────────┬──────────────┬─────────────┐
┌───────────┐ ┌──────────┐ ┌──────────┐ ┌──────────┐ ┌──────────┐
│ Character │ │ Print    │ │ Control  │ │ Define CR│ │ Auto LF  │
│ Sets      │ │ Language │ │ Code 06  │ │ Code     │ │          │
└───────────┘ └──────────┘ └──────────┘ └──────────┘ └──────────┘
     │            │            │            │            │
IBM PC*        See page 4–78. 8.0 LPI*   CR = CR*     Enable*
Multinational                 10.3 LPI   CR = CR + LF  Disable
ECMA Latin 1                  6.0 LPI
DEC Multinational
OCR A
OCR B
0858 PC Euro Multinational
0923 Latin 9 8859–15
```

```
    ┌──────────┬────────────┬────────────┐
┌──────────┐ ┌──────────┐ ┌──────────┐ ┌────────────┐
│Overstrike│ │ Define LF│ │ Printer  │ │ Alternate Set│
│          │ │ Code     │ │ Select   │ │ 80–9F      │
└──────────┘ └──────────┘ └──────────┘ └────────────┘
     │            │            │            │
Enable*        LF = LF*    Disable*    Control Code*
Disable        LF = CR+LF  Enable      Printable
```

```
┌─────────────────────────────────────────┐
│ To view options, press:                 │
│                                         │
│  Scroll ↑  Scroll ↓   Enter    Return   │
│  [    ]   [    ]     [    ]    [    ]    │
│                                         │
│                              Enter      │
│  To select an option, press:  [    ]    │
│                                         │
│  To exit the configuration menus  Start │
│  and return to READY, press:    [    ]  │
│                                         │
│   *  = Factory Default                  │
└─────────────────────────────────────────┘
```

Figure 4–20. Serial Matrix Emulation Menu

(Continued from the Serial Matrix Emulation Menu)

PRINT LANGUAGE
(From page 4–77)

IBM PC	Multinational	ECMA Latin 1	DEC Multinational

Multinational:
ASCII (USA)*
EBCDIC

DEC Multinational:
ASCII (USA)*
French
German
English (UK)
Norwegian/Danish
Swedish
Italian
Spanish
Japanese
French Canadian
Dutch
Finnish
Swiss

Select Subset
Primary

Select Subset
Extended

Select Subset
Primary

Select Subset
Extended

IBM PC Select Subset Primary:
ASCII (USA)*
French
German
English (UK)
Danish
Swedish
Italian
Spanish
Japanese
French Canadian
Latin American
Danish II
Spanish II
Latin American II

IBM PC Select Subset Extended:
0437 PC Character Set*
0850 PC Multilingual

ECMA Latin 1 Select Subset Primary:
ASCII (USA)*
German
Swedish
Danish
Norwegian
Finnish
English (UK)
Dutch
French
Spanish
Italian
Turkish
Japanese

ECMA Latin 1 Select Subset Extended:
Multinational*
Barcode 10 CPI
Multinational DP 10 CPI
Multinational DP 12 CPI
Multinational NLQ 10 CPI
Greek DP 10 CPI
Greek DP 12 CPI
Greek NLQ 10 CPI
Graphic DP 10 CPI
Graphic NLQ 10 CPI
Scientific DP 10 CPI
Scientific DP 12 CPI
Scientific NLQ 10 CPI

To view options, press:

Scroll ↑   Scroll ↓   **Enter**   Return

Enter
To select an option, press:

Start
To exit the configuration menus
and return to READY, press:

* = Factory Default

Figure 4–21. Serial Matrix Print Language Menu

Character Sets

This parameter selects a character set for the Serial Matrix emulation. Once you have selected a character set, you must also define a print language for that character set, described under the PRINT LANGUAGE option.

*   IBM PC (the default)

*   MULTINATIONAL

*   ECMA LATIN 1

*   DEC MULTINATIONAL

*   OCR A

*   OCR B

*   0858 PC EURO MULTILINGUAL

*   0923 LATIN 9 8859–15

NOTE: See the *6400 ASCII Programmer's Reference Manual* for more information on character sets.

Print Language

If you selected one of the character sets other than OCR A/OCR B, 0858, or 0923 (which have only one available print language), you must also select a print language for that character set. The print languages available for each character set are shown in Figure 4–21. The default print language for each character set follows:

*   IBM PC: Default for Select Subset Primary is ASCII (USA).
                                 Default for Select Subset Extended is 0437 PC Character Set.

*   MULTINATIONAL: Default is ASCII (USA).

*   ECMA LATIN 1:   Default for Select Subset Primary is ASCII (USA).
                                 Default for Select Subset Extended is MULTINATIONAL.

*   DEC MULTINATIONAL: Default is ASCII (USA).

Control Code 06

This option will select alternate line spacing. When the printer receives a hex 06 command, the line spacing will change to spacing specified in this option for the current line only.

- 8.0 LPI (the default)
- 10.3 LPI
- 6.0 LPI

Define CR Code

The DEFINE CR CODE (Define Carriage Return Code) option controls the action of the printer when it receives a Carriage Return code (ØD hex) from the host computer. If this feature is enabled, each time the printer receives a Carriage Return, it inserts an additional Line Feed code (ØA hex) into the data stream. Do not use this feature if the host computer sends Line Feeds to the printer.

- CR = CR (the default) does not insert an extra Line Feed after each Carriage Return.
- CR = CR + LF inserts an extra Line Feed after each Carriage Return. The next print position will be print position 1 of the next line.

Auto LF

The AUTO LF (Auto Line Feed) option defines the printer actions when print data is received past the forms width setting.

- ENABLE (the default) performs an automatic carriage return and line feed when data is received past the forms width.
- DISABLE discards any data past the forms width.

Overstrike

The OVERSTRIKE option determines the action required when a line is printed over a previous line because a carriage return was received without a line feed.

- ENABLE (the default) prints the second line on top of the first line.
- DISABLE replaces the characters from the first line with the second line.

Define LF Code

The DEFINE LF CODE (Define Line Feed Code) option determines whether an automatic carriage return should occur whenever a line feed command is received.

- LF = LF (the default) does not perform an automatic carriage return. The next print position will be the current print position of the next line.
- LF = CR + LF forces an automatic carriage return with each line feed command. The next print position will be position 1 of the next line.

Printer Select

The PRINTER SELECT option determines if the ASCII DC1 and DC3 control codes can be used to disable and enable the printer.

- DISABLE (the default) ignores the DC1 and DC3 control codes.
- ENABLE disables the printer when a DC1 control code is received, and enables the printer when a DC3 control code is received.

Alternate Set 80–9F

This option determines if data in the range of hex 80 through hex 9F should be interpreted as a control code or as a printable character.

- CONTROL CODE (the default) interprets data in the range of hex 80 through hex 9F as a control code.
- PRINTABLE prints data in the range of hex 80 through hex 9F.

Print Format Menu

PRINT FORMAT
(From page 4–58)

Characters Per Inch

10.0 Characters Per Inch*
12.0 Characters Per Inch
13.3 Characters Per Inch
15.0 Characters Per Inch
16.7 Characters Per Inch
17.1 Characters Per Inch[3]
18.0 Characters Per Inch
20.0 Characters Per Inch[3]

Lines Per Inch

6.0 Lines Per Inch*
8.0 Lines Per Inch
10.3 Lines Per Inch[3]
3.0 Lines Per Inch
4.0 Lines Per Inch

Forms Width

Forms Width in Inches [1]
  00.1–13.6 Inches
  13.6 Inches*
Forms Width in MM [1]
  .1–345.4 MM
  345.4 MM*
Forms Width in Characters
  1–272 Characters
  132 Characters* [2]

Forms Length

Forms Length in Inches [1]
  00.1–24 Inches
  11.0 Inches*
Forms Length in MM [1]
  000.1–609.6 MM
  279.4 MM*
Forms Length in Lines
  1–192 Lines
  66 Lines*

Print Quality

DP Quality*
Near Letter Quality
OCR A[3]
OCR B[3]
Draft
NLQ Sans Serif[3]

Print Character Table

Print Attributes

Proportional Spacing
  Disable*
  Enable
Italic Print
  Disable*
  Forward Slant
  Backward Slant
Slashed Zero
  Disable*
  Enable
Text Position
  Bottom of Line*
  Top of Line

Margins

Left Margin [1]
  0–369 Characters
  0 Characters*
Right Margin [1]
  0–369 Characters
  0 Characters*
Bottom Margin
  0–451 Lines
  0 Lines*

Perforation Skip

Disable*
1/2 inch
2/3 inch
5/6 inch
1 inch

Reset Command

Load Factory*
Load Power On

Note:
[1] These variables are not available with the Coax/Twinax emulation selected.
[2] In order to select forms width in characters greater than 132 characters for coax/twinax, you must first change maximum printable width to 13.6 inches.
[3] Does not apply to IPDS.

To view options, press:

Scroll ↑   Scroll ↓   **Enter**   Return

To select an option, press: **Enter**

To exit the configuration menus and return to READY, press: Start

* = Factory Default

Figure 4–22. Print Format Menu

Characters Per Inch

CHARACTERS PER INCH (CPI) specifies the number of characters that will print per horizontal inch.

- 10.0 CHARACTERS PER INCH (the default)
- 12.0 CHARACTERS PER INCH
- 13.3 CHARACTERS PER INCH
- 15.0 CHARACTERS PER INCH
- 16.7 CHARACTERS PER INCH
- 17.1 CHARACTERS PER INCH
- 18.0 CHARACTERS PER INCH
- 20.0 CHARACTERS PER INCH

It is possible to specify a CPI value that causes the page width to exceed the maximum physical page width. In this case, the printer automatically changes the page width to the highest valid value for the new CPI.

When OCR A or OCR B is selected as the default print language, 10 CPI is the only available value for this parameter. If a different CPI value is desired, the print language must be changed first.

NOTE: Receipt of a data stream control code that specifies a CPI value overrides any value entered via the operator panel.

Lines Per Inch

LINES PER INCH (LPI) specifies the number of lines that will print per vertical inch.

- 6.0 LINES PER INCH (the default)
- 8.0 LINES PER INCH
- 10.3 LINES PER INCH
- 3.0 LINES PER INCH
- 4.0 LINES PER INCH

It is possible to specify an LPI value that causes the page length to exceed the maximum allowed page length. In this case, the printer automatically changes the page length to the highest valid value for the new LPI.

NOTE: Receipt of a data stream control that specifies the LPI value overrides the value entered via the operator panel.

Forms Width

FORMS WIDTH specifies the forms width in inches, millimeters or characters. All three measurements will update the same configuration parameter. The default values for forms width are 13.6 inches, 345.4 mm and 136 characters.

NOTE: The default values for forms width are 13.2 inches, 335.5 mm and 132 characters when P–Series, Coax/Twinax, IGP, Code V, or IPDS are installed.

NOTE: FORMS WIDTH IN INCHES and FORMS WIDTH IN MM selections are not available with the Coax/Twinax or IPDS emulation. The only variable available with the Coax/Twinax and IPDS emulation is FORMS WIDTH IN CHARACTERS.

Descriptions follow for the three ways of specifying the forms width:

- FORMS WIDTH IN INCHES allows you to input the forms width in inches. Valid values range from 00.1 through 13.6 inches, in increments of 0.1 inch.
- FORMS WIDTH IN MM allows you to input the forms width in millimeters. Valid values range from .1 through 345.4, in increments of tenths of a millimeter (0.1 mm).
- FORMS WIDTH IN CHARACTERS allows you to input the forms width in characters. The maximum forms width in characters depends on the current CPI setting; it is equal to the maximum forms width in inches multiplied by the current CPI setting.

  For example, at 10 CPI, the maximum forms width is:

  10 CPI x 13.6 inches = 136 characters.

  Only valid forms width values will be accepted. If a width is selected that is larger than the maximum width for the current CPI, then the maximum width will be used. If a larger width value is desired, then the CPI value must be changed first.

NOTE: In order to select forms width in characters greater than 132 characters for coax/twinax, you must first change maximum printable width to 13.6 inches.

NOTE: Receipt of a data stream control code that changes the page width overrides the page width previously specified via the operator panel.

The following table lists the maximum number of characters that can be printed for a given Characters Per Inch (CPI) setting.

CPI Setting	Maximum Forms Width (in Characters)
10.0	* 136
12.0	163
13.3	181
15.0	204
16.7	227
17.1	232
18.0	245
20.0	272

* = Default

IMPORTANT

If the forms width is set in characters and the CPI is changed, the effective page width is changed to be equal to the forms width in characters divided by the new CPI. For example, if the current forms width is 132 characters and the CPI is changed from 10 CPI to 15 CPI, the effective forms width changes from 13.2 inches to 8.8 inches.

NOTE: This applies only if the forms width is set in characters. If the forms width is set in inches or millimeters (mm), changing the CPI does not affect the effective forms width.

Forms Length

FORMS LENGTH specifies the forms length in inches, millimeters or lines. All three measurements will update the same configuration parameter. The default values for forms length are 11 inches, 279.4 millimeters, or 66 lines per page.

Descriptions follow for the three ways of specifying the forms length:

NOTE: The actual value displayed for forms length set in inches and mm can be greater than the maximum values listed on the operator panel because the number of lines can exceed actual inches and mm values.

NOTE: FORMS LENGTH IN INCHES and FORMS LENGTH IN MM selections are not available with the Coax/Twinax or IPDS emulations. The only variable available with the Coax/Twinax and IPDS emulations is FORMS LENGTH IN LINES.

- FORMS LENGTH IN INCHES allows you to input the forms length in inches. Valid values range from 00.1 through 24 inches, in increments of 0.1 inch. (This option not available for the coax interface.)
- FORMS LENGTH IN MM allows you to input the forms length in millimeters. Valid values range from 000.1 through 609.6 millimeters, in increments of tenths of a millimeter (0.1 mm). (This option not available for the coax interface.)
- FORMS LENGTH IN LINES allows you to input the forms length in lines. The maximum forms length in lines depends on the current LPI setting; it is equal to the maximum forms length in inches multiplied by the current LPI setting.

  For example, at 6 LPI the maximum forms length is:

    6 LPI x 24 inches = 144 lines

  Only valid forms length values will be accepted. If you select a length that is larger than the maximum length for the current LPI, the maximum length will be used. If you need a longer page length, you must first change the LPI.

IMPORTANT

If the forms length is set in lines and you change the LPI, the effective page length changes to the forms length in characters divided by the new LPI. For example, if the current forms length is 66 lines and you change the LPI from 6 LPI to 8 LPI, then the effective forms length changes from 11 inches to 8.25 inches.

NOTE: This only applies if the forms length is set in lines. If the forms length is set in inches or millimeters, changing the LPI does not affect the effective forms length.

NOTE: Receipt of a data stream control code which changes the forms length overrides the forms length previously specified via the operator panel.

Print Quality

NOTE: When using bold or emphasized printing, the printer prints two dots instead of one to produce the desired effect. This does not affect characters per inch.

This parameter specifies the density (quality) of printing:

- DP Quality (the default)
- Near Letter Quality
- OCR A
- OCR B
- Draft
- NLQ Sans Serif

NOTE: Receipt of a data stream control sequence that changes the print quality overrides the print quality specified via the operator panel.

Specifying a print *quality* of OCR A or OCR B will change the print *language* to OCR A or OCR B.

When OCR A or OCR B is selected as the default print language, OCR A/OCR B are the only available values for this parameter. If a different print quality value is desired, the print language must be changed first.

Print Character Table

This parameter prints out a table of the current interface character set.

Print Attributes

The PRINT ATTRIBUTES parameter is used to determine character and page formatting.

* PROPORTIONAL SPACING uses proportional spacing for text data when enabled.

    DISABLE is the default.
    ENABLE uses proportional spacing for text data.

NOTE: Proportional spacing is only supported in 10 CPI. Therefore, you must select 10 CPI, or proportional spacing will be ignored.

* ITALIC PRINT prints text in italics, when enabled. Both a forward and backwards slanting italic are available.

    DISABLE is the default.
    FORWARD SLANT uses italic print that slants forward.
    BACKWARD SLANT uses italic print that slants backward.

* SLASHED ZERO prints zeros with a slash, when enabled, to distinguish zeros from the alphabetic capital "O."

    DISABLE is the default.
    ENABLE prints zeros with a slash.

* TEXT POSITION specifies where the text will be positioned in the line space. When set to Top of Line, text will be positioned at the top of the line space. When set to Bottom of Line, the text will be positioned as if it were at the bottom of a 6 lpi line space.

    BOTTOM OF LINE is the default
    TOP OF LINE

The following example shows both Top of Line and Bottom of Line text positions for a 6 LPI line spacing:
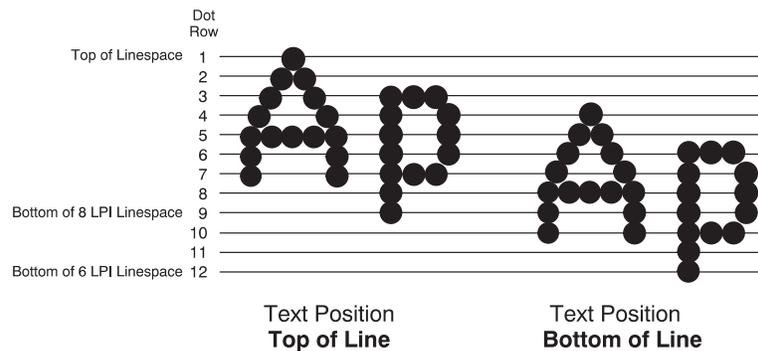
Margins

> **NOTE:** LEFT MARGIN and RIGHT MARGIN selections are not available with the Coax/Twinax emulation. The only variable available with the Coax/Twinax emulation is BOTTOM MARGIN.

The MARGINS parameter defines where the bottom, left, and right page margins are located.

- LEFT MARGIN defines where print position 1 is located. The left margin is specified as the number of characters from the left edge of the forms. Valid values range from 0 through 369 characters. The default is 0 characters.

- RIGHT MARGIN defines where the last print position is located. The right margin is specified as the number of characters from the right edge of the forms. Valid values range from 0 through 369 characters. The default is 0 characters.

- BOTTOM MARGIN defines the location of the last print line on the page. The bottom margin is specified as the number of lines from the bottom of forms position. Valid values range from 0 through 451 lines. The default is 0 lines.

Perforation Skip

> **NOTE:** The PERFORATION SKIP selection is not available with the Coax/Twinax emulation.

Perforation Skip allows or prevents printing on page perforation. When enabled, it sets up a skip-over margin of 1/2 inch, 2/3 inch, 5/6 inch, or 1 inch. For example, a skip-over margin of 1 inch allows a 1 inch margin at the bottom of the page perforation.

Reset Command

Reset Command specifies the configuration that will be used by the printer after the reset command is issued.

- Load Factory will load the factory default configuration for printer use. This is the default selection.

- Load Power On will load the selected power on configuration for printer use.

Operator Print Tests Menu
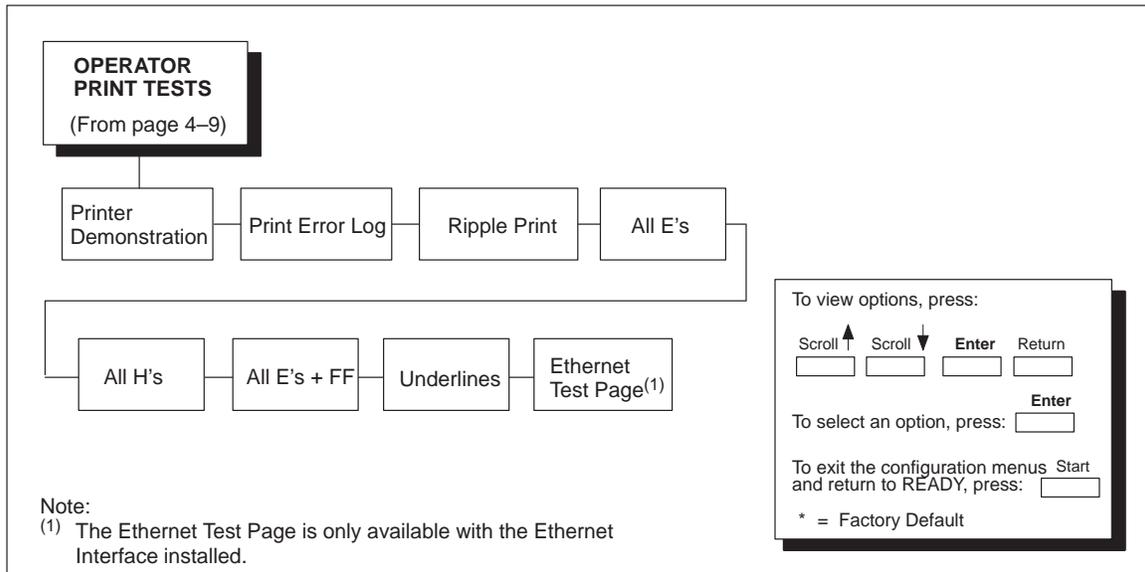
Figure 4–23. Operator Print Tests Menu

The print tests are used to check the print quality and operation of your printer. The procedure to run these tests is shown on page 6–7. The self-tests include the following:

- **Printer Demonstration** — Demonstrates some of the functions and features available on the printer.

- **Print Error Log** — Prints a log of errors that have occurred in the printer.

- **Ripple Print** — A "sliding" alphanumeric pattern used to identify missing or malformed characters, improper vertical alignment, or vertical compression.

- **All E's** — A pattern of all uppercase E's that identifies missing characters, misplaced dots, smeared characters, improper phasing problems, or light/dark character variations.

- **All H's** — A pattern of all uppercase H's used to detect missing characters, misplaced dots, smeared characters, or improper phasing.

- **All E's + FF** — A pattern of all E's repeated for ten lines and followed by a form feed to the next page top-of-form, used to identify paper motion or feeding problems, such as paper path obstruction or improper forms.

- **Underlines** — An underline pattern useful for identifying hammer bank misalignment.

- **Ethernet Test Page** — Prints an ethernet configuration page. If the ethernet interface is not properly installed, this page will not print.

NOTE: This page contains important system and ethernet information and should be maintained with your system configuration printout.

NOTE: Your IBM Customer Service Representative will typically run these tests.

Printer Information Menu
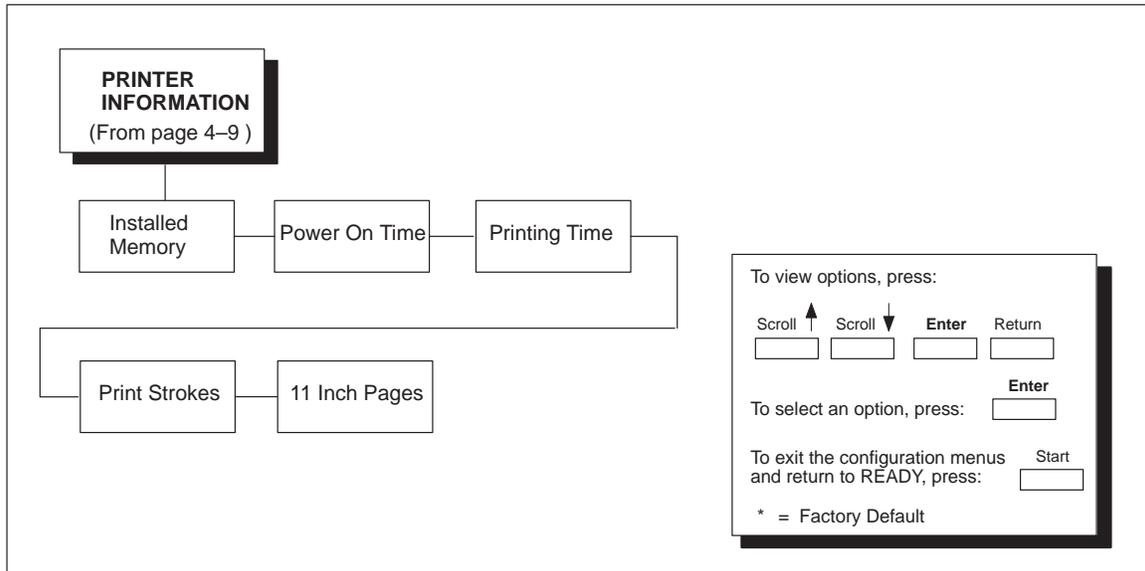
Figure 4–24. Printer Information Menu

You can view various printer statistics, such as hours of usage, and refer to these figures for preventive maintenance purposes. Printer statistics accumulate continuously; they do not reset when you power off the printer.

All of the printer statistics are set to zero at the factory after burn-in testing.

Installed Memory   Displays the amount of RAM installed in the printer in megabytes.

Power-on Time: The cumulative time in hours the printer has been powered on. The range is 0 through 30,000 hours.

Printing Time: The cumulative time in hours the printer has actually been printing. The range is 0 through 30,000 hours.

Print Strokes: The cumulative number of back-and-forth shuttle strokes the printer has printed during normal operation. The range is 0 through 4,000,000,000 shuttle strokes.

11 Inch Pages   The cumulative number of pages the printer has printed. The range is 0 through 363,000,000 pages.

RIBBONMINDER Menu

RibbonMinder** monitors ink consumption to ensure quality printing. The "RibbonMinder" chapter explains how to use this feature and its options in more detail.
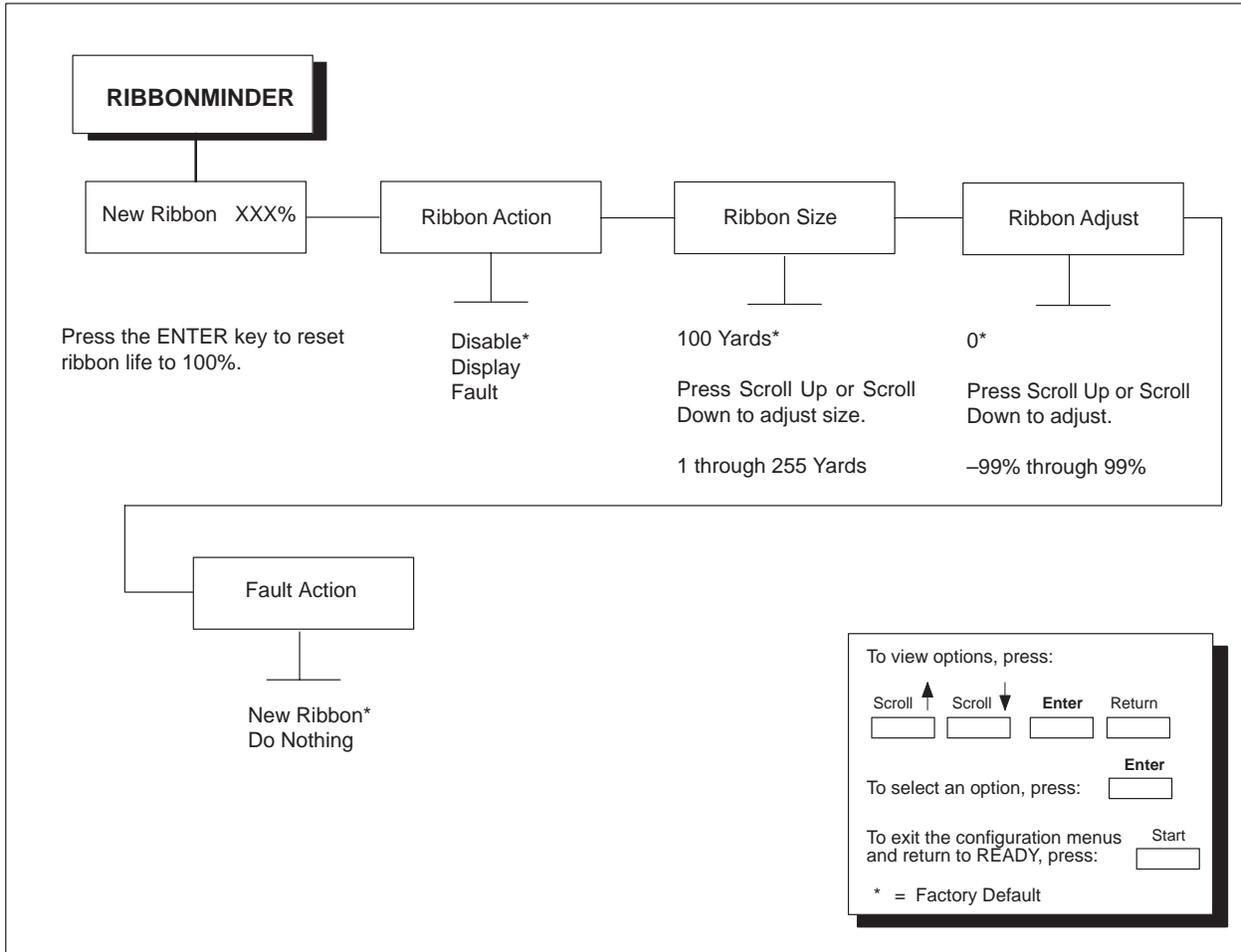
Figure 4–25. Ribbon Life Menu

New Ribbon

Whenever you install a new ribbon, and are using the RibbonMinder feature, the ribbon life must be reset to 100%. You can reset the ribbon life to 100% from the operator panel using the New Ribbon option by pressing the **Enter** key.

Ribbon Action

This option allows you to select the following three functions:

- DISABLE does not display the RibbonMinder ink consumption percentage. The percentage is calculated but not displayed.
- DISPLAY allows you to view the RibbonMinder ink consumption display.
- FAULT displays an error message, which is Ribbon Ink Out, Change Ribbon, when the RibbonMinder consumption percentage falls below zero. The error message can be cleared and printing can continue for approximately another two minutes. If either the RibbonMinder is not reset or a new ribbon is not installed, an error message will be displayed again.

Ribbon Size

You can use the Ribbon Size option to specify the ribbon length in increments of one yard.

Minimum size is 1 yard and maximum size is 255 yards. (Default is 100 yards.) Although you can enter a number between 1 and 255, you should make sure the number matches the ribbon size, which is either 60 or 100 yards. Therefore, you would enter either 60 or 100.

Ribbon Adjust

Enables you to print more or less pages before the display reaches 0%. Refer to Chapter 7, "RibbonMinder," for more information.

The setting can range from –99% through 99%. 0% is the default.

Fault Action

Allows you to select the way the fault message will be reset.

- NEW RIBBON resets the ribbon life to 100 percent when you open the platen to change the ribbon.
- DO NOTHING means that the ribbon life may only be reset via the New Ribbon menu option.

5   **Printer Interfaces**

Chapter Contents

Overview

The printer interface is the point where the data line from the host computer plugs into the printer. The interface processes all communications signals and data to and from the host computer. The printer interface consists of a printed circuit board assembly (PCBA) and a cable connector for the data line. Communication signals and data may be sent over parallel or serial lines.

Each IBM 6400 printer is equipped with three parallel interface protocols and two serial interface protocols. Coax and twinax interface protocols are available as optional features. Each interface is selected via the operator panel configuration menu. (Refer to Chapter 3, "Configuring the Printer.")

The Ethernet interface is also an optional feature. Ethernet interface information is contained in the *Ethernet Interface User's Manual*. Ethernet parameters are set using the operator panel. Information for this procedure is given on page 4–45.

This chapter describes the interfaces provided with the printer. In addition, instructions are provided for configuration of terminating resistors.

- Coax / Twinax
- RS–232 serial
- RS–422 serial
- PC Parallel
- Dataproducts parallel
- IEEE 1284
- Ethernet 10BaseT
- Ethernet 10Base2

RS–232 and RS–422 Serial Interfaces

> **NOTE:** The RS–232 and RS–422 serial interface circuit characteristics are compatible with the Electronic Industry Association Specifications EIA–232–E and EIA–422–B.

The RS–232 and RS–422 serial interfaces enable the printer to operate with bit serial devices that are compatible with an RS–232 controller. The input serial data transfer rate (in baud) is selectable from the printer operator panel. Baud rates of 600, 1200, 2400, 4800, 9600, 19,200, 38,400, 57,600, and 115,200 are available.

The input format consists of a single start bit, 7 or 8 data bits, and one or two stop bits. The number of data bits is determined by printer configuration. The data bits are interpreted with the least significant bit first. Parity checking is determined by printer configuration options selected from the operator panel.

The printer interface uses a first-in/first-out buffer. The asynchronous interface accepts data as it is provided by the host. The length of the data cable from the host computer to the printer must not exceed 50 feet (15 meters) for RS–232 interfaces and 4000 feet (1220 meters) for RS–422 interfaces.

Table 5–1. RS–232 Serial Interface Connector Pin Assignments

Input Signals		Output Signals		Miscellaneous	
Signal	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**
Received Data (RD)	3	Transmit Data (TD)	2	Chassis Ground	1
Clear To Send (CTS)	5	Request To Send (RTS)	4	Signal Ground	7
Data Set Ready (DSR)	6	Data Terminal Ready (DTR)	20		
Data Carrier Detect (DCD)	8				

Table 5–2. RS–422 Serial Interface Connector Pin Assignments

Input Signals		Output Signals		Miscellaneous	
Signal	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**
– Receive Data (–RD)	15	– Transmit Data (–TD)	19	Chassis Ground	1
+ Receive Data (+RD)	17	+ Transmit Data (+TD)	25	Signal Ground	7

RS–232 and RS–422 Serial Interface Signals

The RS–232 connector mounted on the printer is a 25–pin DB–25S type. The mating connector is a DB–25P. RS–232 and RS–422 compatible serial interface signals are defined as follows:

RS–232:

Received Data (RD) — Serial data stream to the printer.

Transmitted Data (TD) — Serial data stream from the printer for transmitting status and control information to the host. Subject to protocol selection.

Request To Send (RTS) — Control signal from the printer. Subject to configuration.

Clear To Send (CTS) — Status signal to the printer indicating the host is ready to receive data/status signals from the printer.

Data Set Ready (DSR) — Status signal to the printer indicating the host is in a ready condition.

Data Carrier Detect (DCD) — Status signal to the printer. The ON condition is required for the printer to receive data.

Data Terminal Ready (DTR) — Control signal from the printer. Subject to configuration.

RS–422:

+RD, –RD — Serial data stream differentially received by printer.

+TD, –TD — Differentially driven serial data stream for transmitting status and control information to the host. Subject to protocol selection.

NOTE: $\pm$**RD** and $\pm$**TD** form signal and return paths of a differential line signal.

RS–232 Serial Interface Protocols

DTR — (DTE Ready). The printer controls the data flow by asserting or de–asserting this hardware signal to the host. If there is enough room in the printer buffer, the printer will send a high signal; if the buffer is full the printer will send a low signal. DTR tells the host if it is safe to send more data. (If the host sends data during an unsafe condition, data will be lost.)

RS–232 and RS–422 Serial Interface Protocols

X–ON / X–OFF — Transmit On / Transmit Off. The printer transmits an X–ON character (hex 11) when entering the Ready mode or when the buffer is almost empty. The printer transmits an X–OFF character (hex 13) when entering the Not Ready mode or when the buffer is almost full.

ETX / ACK — End of Text / Acknowledge. The host controls the flow of communication to the printer by sending a block of data and ending the block with an End of Text (ETX) signal. When the printer receives the ETX signal, it will acknowledge it has received the entire block of data.

ACK / NAK — Acknowledge / Negative Acknowledge. ACK means acknowledge; the device acknowledges it has accepted a transmission. NAK means a negative acknowledge; the device did not receive the transmission.

RS–232 and RS–422 Serial Interface Error Handling

NOTE: All serial errors are treated as faults that require operator intervention.

Parity Error Handling — Parity error checking is a configuration option selected from the operator panel.

With odd or even parity checking selected, a character with a parity error is replaced with a question mark (?) character.

When parity checking is not selected ("NONE" on the operator panel), parity errors are ignored and the characters are printed as received.

Framing Error Handling — Framing error checking is always in effect for the serial interface.

When a framing error occurs, an exclamation point (!) is printed. If 20 successive errors are received, a line feed is added to force printing to occur.

Overrun Error Handling — Overrun error checking is always in effect for the serial interface.

When a data overrun error occurs, an asterisk (*) is printed. If 20 successive errors are received, a line feed is added to force printing to occur.

RS–232 and RS–422 Serial Interface Configuration

Your printer is configured at the factory to match the interface you specified. By using the operator panel, you may verify and change several interface parameters in order to meet specific application requirements.

Refer to Chapter 4, "Configuration Menus," for RS–232 and RS–422 parameter descriptions and information on selecting values for the following parameters:

RS–232 and RS–422:

- Baud Rate (data rate selected from the operator panel)
- Data Bits (7 or 8 Bits)
- Stop Bits (1 or 2 Bits)
- Parity (None, Odd, Even, Mark or Sense)

RS–232 only:

- Data Terminal Ready logic
- Request to Send logic

Some application programs require a unique configuration. If the printer is not working properly in the configuration you selected, contact an IBM service representative.

One Char Enquiry

When enabled, and the IGP feature is available, a status byte is sent back to the host when the poll character or the command SFCC enquiry is sent to the printer (serial interface only). The poll character is received and the status byte is sent whether the printer is online or offline. The SFCC enquiry will only be processed when the printer is online.

Poll Character

This option is used when One Char Enquiry is enabled and the IGP feature is available. Whenever the printer receives this character, it sends a response to the host indicating the current state of the printer. It may be configured from 0 through 255. The default value is 0.

PC Parallel Interface

The PC Parallel interface (also referred to as the "Centronics" interface) enables the printer to operate with controllers designed for buffered PC Parallel printers. The length of the data cable from the host computer to the printer must not exceed 15 feet (5 meters).

NOTE: For a more reliable data transfer, a maximum cable length of six feet is recommended.

Table 5–3. Printer PC Parallel Interface Connector Pin Assignments

Input Signals		Output Signals		Miscellaneous	
Signal	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**
DATA LINE 1	2	ACKNOWLEDGE	10	CHASSIS GROUND	17
Return	20	Return	28		
DATA LINE 2	3	ONLINE/SELECT	13	GROUND (GND)	16, 30
Return	21	Fault	32		
DATA LINE 3	4	PAPER EMPTY	12	(NC)	34
Return	22	Return	30		
DATA LINE 4	5	BUSY	11		
Return	23	Return	29		
DATA LINE 5	6	NAUTO FEED	14		
Return	24				
DATA LINE 6	7	NINIT (PRIME)	31		
Return	25				
DATA LINE 7	8	NOT DATAPRODUCTS*	35		
Return	26				
DATA LINE 8	9	EXTERNAL 5 VOLTS	18		
Return	27				
DATA STROBE	1	N SELECT	36		
Return	19				
PAPER INSTRUCTION	15			* Used by DP adapter.	
Return	33				

PC Parallel Interface Signals

The PC Parallel interface signals between the host computer and the printer are defined as follows:

Data Lines 1 through 8 — Provide eight standard or inverted levels from the host that specify character, data, plot data, or function code. Data Line 8 allows access to the extended ASCII character set. You may enable or disable this line via the Data Bit 8 parameter on the System Interface Parameters and PC Parallel submenus.

Data Strobe — Carries a low true, 100 ns min. pulse from the host that clocks data into the printer.

Paper Instruction (PI) —Carries a VFU control signal from the host with the same timing as the data lines.

Acknowledge — A low true pulse from the printer indicating the character or function code has been received and the printer is ready for the next data transfer.

Online/Select — A high true level from the printer to indicate the printer is ready for data transfer and the **Start** key on the operator panel has been activated. When the printer is in Ready mode, it may accept data from the host.

Paper Empty (PE) — A high true level from the printer to indicate the printer is in a fault condition.

Busy — A high true level from the printer to indicate the printer cannot receive data.

PC Parallel Interface Configuration

Your printer is configured at the factory to match the interface you specified. By using the operator panel, you may verify and change several interface parameters in order to meet specific application requirements.

Refer to Chapter 4, "Configuration Menus," for PC Parallel parameter descriptions and information on selecting values for the following parameters:

- Data Bit 8 (enable or disable)
- Data Polarity (standard or inverted)
- Strobe Polarity (standard or inverted)
- Response Polarity (standard or inverted)
- Busy on Strobe (enable or disable)
- Latch Data On Leading or Trailing Edge of Strobe
- Prime Signal (enable or disable)
- TOF Action at Prime Signal (do nothing or form feed)
- Buffer Size in kilobytes (1 to 16)

Some application programs require a unique configuration. If the printer is not working properly in the configuration you have selected, contact an IBM service representative.

Dataproducts Parallel Interface

The Dataproducts parallel interface allows the printer to operate with a 50-pin Amplimite (AMP) HDH-20 data cable connector. This adapter can be obtained as a feature on the 6400. The length of the data cable from the host computer to the printer must not exceed 40 feet (12 meters).

Table 5–4. Dataproducts Parallel Interface Connector Pin Assignments (with a 50-pin AMP HDH-20 Data Cable Connector)

Input Signals		Output Signals		Miscellaneous	
Signal	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**
DATA LINE 1	19	READY	22	CABLE VERIFY	45, 46
Return	3	Return	6		
DATA LINE 2	20	ONLINE	21	GROUND	39
Return	4	Return	5		
DATA LINE 3	1	DEMAND/DATA REQUEST	23		
Return	2	Return	7		
DATA LINE 4	41				
Return	40				
DATA LINE 5	34				
Return	18				
DATA LINE 6	43				
Return	42				
DATA LINE 7	36				
Return	35				
DATA LINE 8	28				
Return	44				
DATA STROBE	38				
Return	37				
PAPER INSTRUCTION	30				
Return	14				
Note: Pins not listed are not connected.					

Dataproducts Parallel Interface Signals

Dataproducts-compatible interface signals between the host computer and the printer are defined as follows:

Data Lines 1 through 8 — Provide eight standard or inverted levels from the host that specify character data, plot data, or a control code. Data Line 8 allows access to the extended ASCII character set. You may enable or disable this line via the Data Bit 8 parameter on the System Interface Parameters and Dataproducts submenus.

Data Strobe — Carries a high true pulse from the host when data is ready. The data strobe remains high until the Data Request line goes false. The active edge of the strobe signal can be configured as leading (default) or trailing.

Paper Instruction (PI) — Carries a DAVFU signal from the host with the same timing and polarity as the data lines.

Ready — Carries a high true signal from the printer when AC power and DC voltages are present, paper is loaded properly, and the printer is not in a check condition.

Online — Carries a high true signal from the printer when the Ready Line is true and the **Start** key on the operator panel has been activated. When the printer is in Ready mode, it may accept data from the host.

Demand/Data Request — Carries a high true signal from the printer when the printer is ready to accept character data from the host. This signal changes to false shortly after the leading edge of the data strobe signal.

Cable Verify — Two pins on the interface connector are jumpered together to allow the user to verify proper installation of the interface connector.

Dataproducts Parallel Interface Configuration

Your printer is configured at the factory to match the interface you specified. By using the operator panel, you may verify and change several interface parameters in order to meet specific application requirements.

Refer to Chapter 4, "Configuration Menus," for Dataproducts parameter descriptions and information on selecting values for the following parameters:

- Data Bit 8 (enable or disable)
- PI Ignored (enable or disable)
- Data Polarity (standard or inverted)
- Data Request Polarity (standard or inverted)
- Strobe Polarity (standard or inverted)

Some application programs require a unique configuration. If the printer is not working properly in the configuration you have selected, contact an IBM service representative.

IEEE 1284 Parallel Interface

The IEEE 1284 is a parallel interface with bidirectional capabilities. Features include the following:

- Faster data transmission. Timing of the signals has been reduced.

- Bidirectional communication. Both the host and the printer can send data.

- Versatility. If a device cannot send data along particular lines, the 1284 can work around this and send data via other operating modes, such as Nibble Mode which is discussed later.

- Less user interaction. The host can ask the printer about printing status and supported features, such as fonts and internal errors. For example, instead of having to physically check if the printer has run out of paper, you can create a program to query this from the host. The printer will respond and a message will display on the host.

Operating Modes

The 1284 supports three operating modes, which are determined by negotiation between the printer and the host.

Compatibility Mode

This mode provides compatibility with a Centronics or PC Parallel interface. Data is transferred from the host to the printer in 8–bit bytes over the data lines.

Compatibility Mode can be combined with Nibble and Byte Modes to provide bidirectional communication.

Nibble Mode

Eight bits equals one byte. When a byte of data is sent to the printer, the eight bits are sent over eight data lines.

Some devices cannot send data over their eight data lines. To bypass this, the 1284 permits data to be sent as half a byte over four status lines. (Half a byte equals one nibble.) Two sequential four–bit nibbles are sent over the lines.

Data is transferred from printer to host in four-bit nibbles over the status lines, and the host controls the transmission.

Byte Mode

> The printer and host send data to each other along eight data lines (one bit per line).

> If bidirectional communication is supported by the printer and the host, the host will take control of the data transfer.

The Negotiation Phase

The negotiation phase determines which operating mode will be used. At this time, the host and the printer will sense what devices are attached, the supported signals available, and which mode to use. The selected mode, in turn, defines the pins on the 1284 connector.

There are 36 pins on the parallel interface. Each one sends a different signal. Pin 1, for example, can send a Strobe signal or a HostClk signal, depending on the mode selected. Table 5–5 on page 5–15 shows the different definitions.

Signals

1284 interface signals between the host and the printer are defined below.

Host Clock / nWrite – Driven by host. Data transferred from host to printer. When printer sends data, two types are available. If Nibble Mode, signal is set high. If Byte Mode, signal is set low.

Data 1 through Data 8 – These pins are host–driven in Compatibility Mode and bidirectional in Byte Mode. They are not used in Nibble Mode. Data 1 is the least significant bit; Data 8 is the most significant bit.

Printer Clock / Peripheral Clock / Interrupt – Driven by the printer. A signal from the printer indicating the character or function code has been received and the printer is ready for the next data transfer.

Printer Busy / Peripheral Acknowledge / nWait – Driven by the printer. Indicates the printer cannot receive data. (Data bits 4 and 8 in Nibble Mode.)

Acknowledge Data Request / nAcknowledge Reverse – Driven by the printer. Indicates the printer is in a fault condition. (Data bits 3 and 7 in Nibble Mode.)

Xflag – Driven by the printer. A high true level indicating the printer is ready for data transfer and the printer is on–line. (Data bits 2 and 6 in Nibble Mode.)

Host Busy / Host Acknowledge / NDStrobe – Driven by the host. Activates auto–line feed mode.

Peripheral Logic High – Driven by the printer. When set to high, the printer indicates all of its signals are in a valid state. When set to low, the printer indicates its power is off or its signals are in an invalid state.

nReverse Request – Driven by the host. Resets the interface and forces a return to Compatibility Mode idle phase.

nData Available / nPeripheral Request – Driven by the printer. Indicates the printer has encountered an error. (Data bits 1 and 5 in Nibble Mode.)

1284 Active / nAStrobe – Driven by the host. A peripheral device is selected.

Host Logic High – Driven by the host. When set to high, the host indicates all of its signals are in a valid state. When set to low, the host indicates its power is off or its signals are in an invalid state.

nInit – Resets init interface from the host.

NOTE: The length of the data cable from the host computer to the printer should not exceed 5 meters (15 feet). For greater data reliability, use a cable of 1.8 meters (6 feet) or less.

Table 5–5. Printer 1284 Connector Signals

Pin	Source of Data	Type of Mode		
		Compatible	Nibble	Byte
1	Host	nStrobe	HostClk	Host/Clk
2	Host/Printer	Data 1 (LSB)		
3	Host/Printer	Data 2		
4	Host/Printer	Data 3		
5	Host/Printer	Data 4		
6	Host/Printer	Data 5		
7	Host/Printer	Data 6		
8	Host/Printer	Data 7		
9	Host/Printer	Data 8 (MSB)		
10	Printer	nAck	PtrClk	PtrClk
11	Printer	Busy	PtrBusy	PtrBusy
				(continued next page)

Table 5–5. 1284 Signals *(continued)*

Pin	Source of Data	Type of Mode		
		Compatible	**Nibble**	**Byte**
12	Printer	PError	AckDataReq	AckDataReq
13	Printer	Select	Xflag	Xflag
14	Host	nAutoFd	Host Busy	HostAck
15		Not Defined		
16		Logic Gnd		
17		Chassis Gnd		
18	Printer	Peripheral Logic High		
19		Signal Ground (nStrobe)		
20		Signal Ground (Data 1)		
21		Signal Ground (Data 2)		
22		Signal Ground (Data 3)		
23		Signal Ground (Data 4)		
24		Signal Ground (Data 5)		
25		Signal Ground (Data 6)		
26		Signal Ground (Data 7)		
27		Signal Ground (Data 8)		
28		Signal Ground (PError, Select, nAck)		
29		Signal Ground (Busy, nFault)		
30		Signal Ground (nAutoFd, nSelectIn, nInit)		
31	Host	nInit		
32	Printer	NFault	nDataAvail	aDataAvail
33		Not Defined		
34		Not Defined		
35		Not Defined		
36	Host	nSelectIn	1284 Active	1284 Active

Terminating Resistor Configurations

The factory equips the printer with several resistors that are used for parallel interface configurations and are suitable for most applications. These 470 ohm pull-up and 1K ohm pull-down terminating resistors are located within the electronics of the machine and should be accessed only by a trained service representative.

If the values of these terminating resistors are not compatible with the particular interface driver requirements of your host computer, you may need to have a different resistor combination installed on your printer. You must call your printer service representative to have this situation addressed.

6 Routine Service and Diagnostics

Chapter Contents

Overview

This chapter discusses general cleaning, running diagnostic tests, and understanding fault messages.

The printer requires no routine maintenance beyond regular cleaning. Periodically remove excess paper chaff and dust from the ribbon and paper paths. If print quality or paper motion deteriorates seriously even after cleaning, contact your IBM service representative for prompt attention.

Cleaning Requirements

Periodic cleaning ensures efficient operation and clear print quality. If the printer is located in a dusty area or is used for heavy duty printing, clean it more often.

DANGER:

> **<2> Switch off printer power and unplug the printer power cord before cleaning the printer.**

Cleaning the Outside of the Cabinet

Clean the outside of the cabinet with a soft, lint-free cloth and mild detergent soap. (Dishwashing liquid works well.) Do not use abrasive powders or chemical solvents. Clean the windows with plain water or mild window cleaner.

ATTENTION

Always apply the cleaning solution to the cloth; never pour cleaning solution directly onto the printer.

Cleaning Inside the Cabinet

Over time, particles of paper, ink, and ribbon accumulate inside impact printers. This is normal. These particles must be removed periodically to avoid degraded print quality. Most paper particles accumulate around the ends of the platen and ribbon path.

To clean the interior of the printer, refer to Figure 6–1 (cabinet models) or Figure 6–2 (pedestal models) and perform the following steps:

1. Power off the printer and unplug the printer power cord.

2. Unload the paper (explained in the *Operator's Guide*).

3. Unlatch both ribbon spools and carefully lift them off the hubs. Raise the ribbon out of the ribbon path.

4. Using a soft-bristled non-metallic brush, remove paper, ribbon, and dust particles from the paper path, ribbon guides, and ribbon path.

5. Brush and vacuum accumulated paper, ribbon, and dust particles, especially in the tractor, hammer bank, and base pan areas.

6. Cabinet models: Brush and vacuum up dust or residue that has accumulated inside the lower cabinet.

7. Cabinet models: Wipe the lower cabinet interior with a clean, lint-free cloth dampened with water and mild detergent. Dry the lower cabinet interior by wiping it with a clean, dry, lint-free cloth.

8. Cabinet and Pedestal models: Install the ribbon (page 2–38), load the paper (page 2–43), and set the top-of-form (page 2–53).

Ribbon
Spool

Splined Shaft

Tractor
(1 of 2)

Hub Latch

Ribbon Hub

Ribbon Path
Diagram

Shuttle Cover
Assembly

Forms Thickness
Lever

Ribbon Guide
(1 of 2)

Base pan
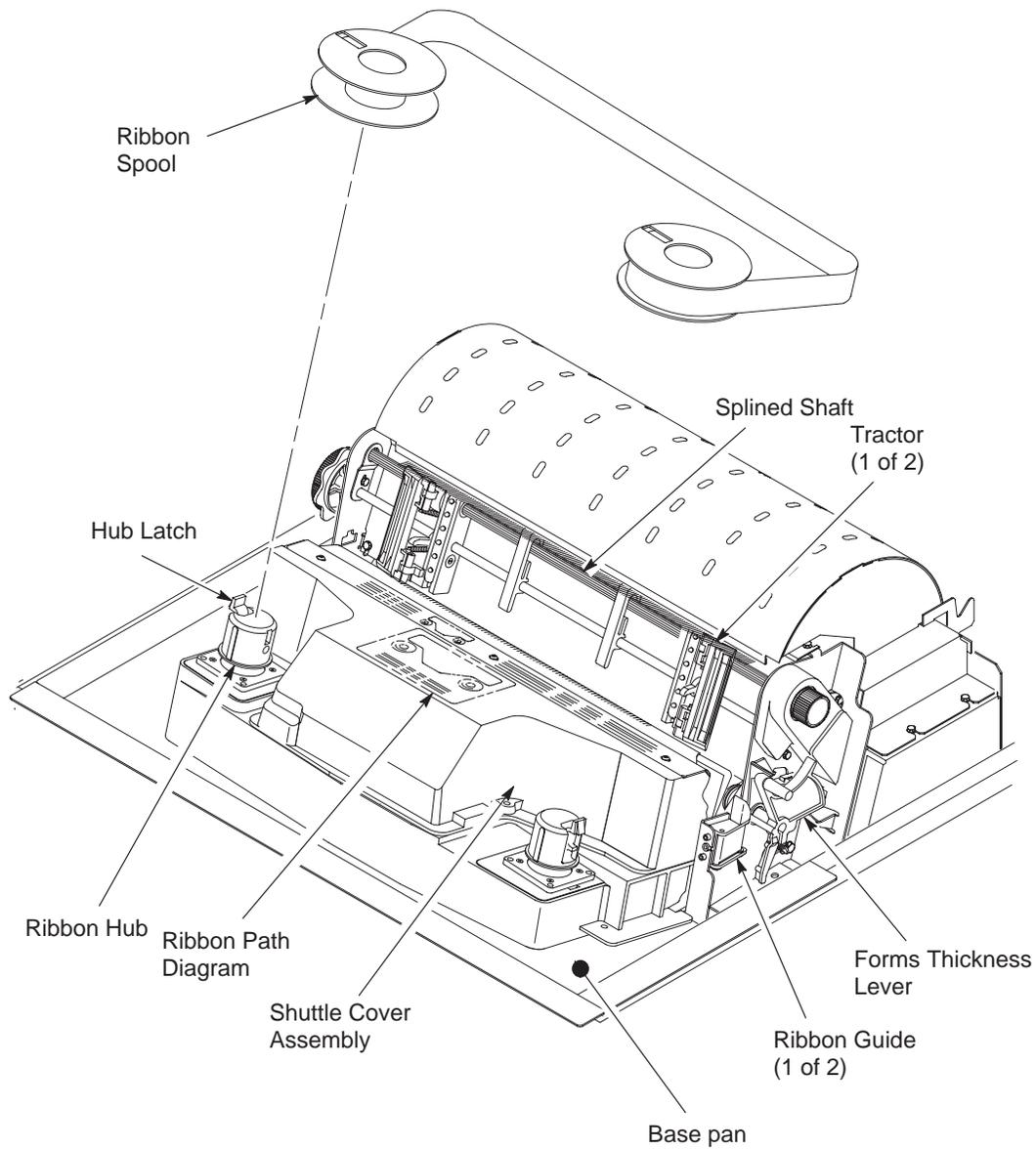
Figure 6–1. Cleaning the Printer, Cabinet Models
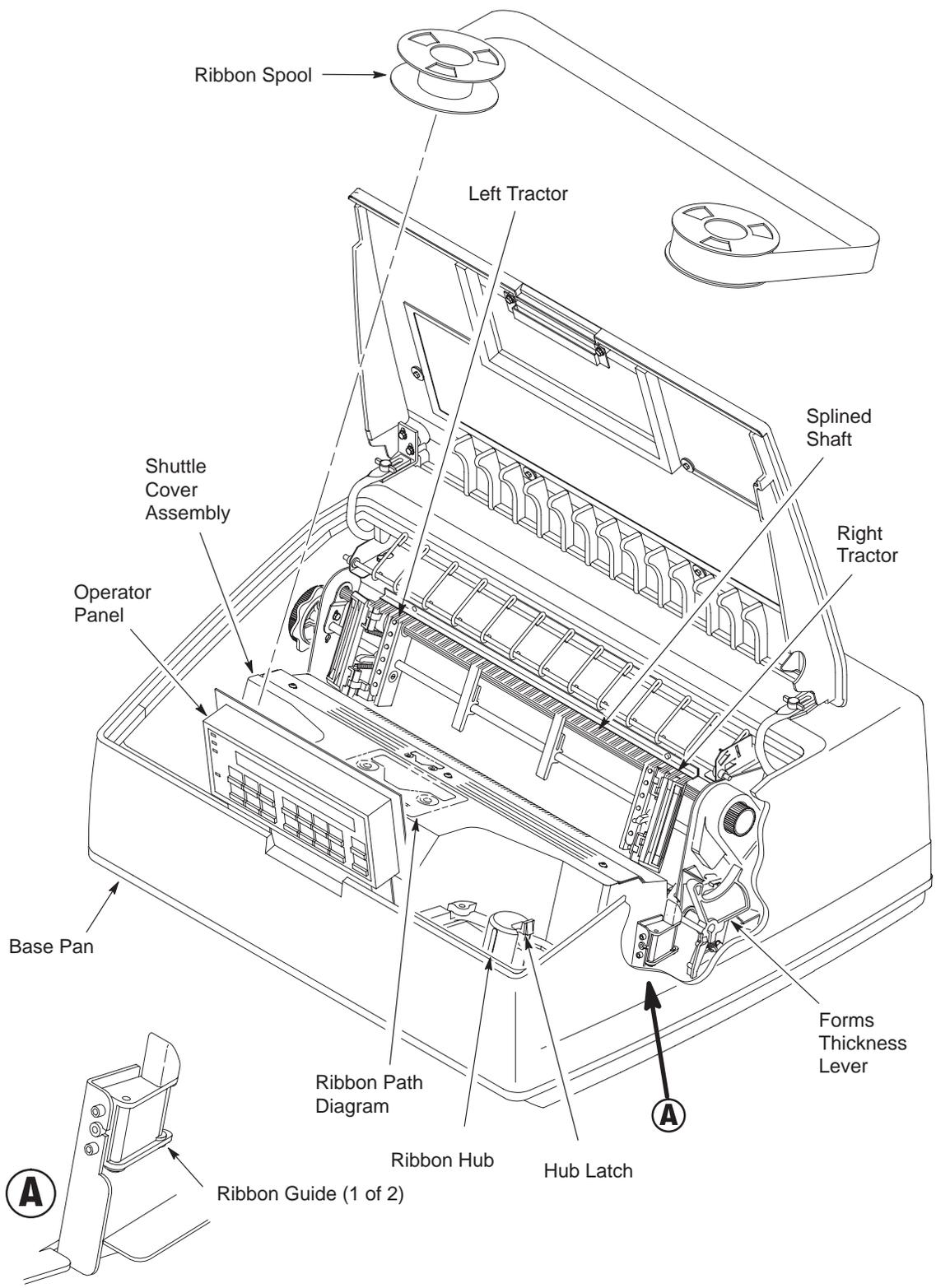
Figure 6–2. Cleaning the Printer, Pedestal Models

Printer Self-Tests

With the exception of testing the interface between the printer and the host computer (and the associated data cable), you do not need to send data from the host computer to the printer to test printer operation. You can use the printer's built-in diagnostic tests to check many of the functions of your printer, including print quality and overall operation. These diagnostic tests include the following:

- **Printer Demonstration**

  Demonstrates all the functions and features available on the printer.

- **Print Error Log**

  This test prints the contents of the printer's internal error log.

- **Ripple Print**

  A "sliding" alphanumeric pattern used to identify missing or malformed characters, improper vertical alignment, or vertical compression.

- **All E's**

  A pattern of all uppercase letter E's used to identify missing characters, misplaced dots, smeared characters, improper phasing, or light/dark character variations.

- **All H's**

  A pattern of all uppercase letter H's used to detect missing characters or dots, smeared characters, or improper phasing.

- **All E's** + **FF (Form Feed)**

  A pattern of all uppercase E's repeated for ten lines and followed by a form feed to the next page top-of-form, used to identify paper motion or feeding problems, such as paper path obstruction or improper forms.

- **Underlines**

  An underline pattern useful for identifying hammer bank misalignment.

NOTE: The Operator Print Test menu is displayed in Chapter 4, "Configuration Menus," on page 4–90.

Running the Printer Self-Tests

Step	Key	Result	Notes
1.	Make sure that the ribbon is installed and the printer is powered on and loaded with paper.		
2.	Press: **Stop**	NOT READY	Places the printer in Not READY mode.
3.	**Scroll ↑** + **Scroll ↓**	OPERATOR MENU UNLOCKED	Press both keys at the same time. Unlocking the Operator Menu allows you to test your printer.
4.	**Menu**	OPERATOR MENU PRINTER CONTROL	First of the series of configuration menus.
5.	**Scroll ↑** UNTIL	OPERATOR MENU OPERATOR PRINT TESTS	Advances to the OPERATOR PRINT TESTS menu.
6.	**Enter**	OPERATOR PRINT TESTS PRINTER DEMONSTRATION*	Advances to PRINTER DEMONSTRATION, the first option in OPERATOR PRINT TESTS menu.
7.	**Scroll ↑** UNTIL	OPERATOR PRINT TESTS [TEST NAME]	Cycles through the list of print tests until you reach the name of the test you wish to run.
8.	**Enter**	OPERATOR PRINT TESTS [TEST NAME]	The print test you have selected starts printing at either 80 or 136 columns, as specified.
9.	**Enter**	OPERATOR PRINT TESTS [TEST NAME]	The print test stops printing.
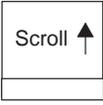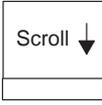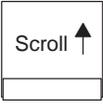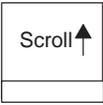
Step	Key	Result	Notes
10.	Examine the print quality of the characters. They should be fully formed and of uniform density. If the test does not run or if text characters do not appear correctly formed, contact your IBM service representative.		
11.	Stop	NOT READY	Returns the printer to the NOT READY mode.
12.	Scroll ↑ + Scroll ↓	OPERATOR MENU LOCKED	Locks Program mode and the Operator Menu.
13.	Start	READY	Returns the printer to the READY mode.

Hex Code Printout

A hex code printout (or hex dump) lists each ASCII/EBCDIC data character received from the host computer, along with its corresponding two-digit hexadecimal code. Hex dumps can be used to troubleshoot some types of printer data reception problems.

To convert an ASCII/EBCDIC character to its corresponding hex code (or vice-versa), refer to the ASCII code chart in the *6400 ASCII Programmer's Reference Manual*, or the EBCDIC code chart in the *6400 Coax/Twinax Programmer's Reference Manual.*

Each printable character prints both as its assigned symbol and as its hex equivalent. Each nonprintable character prints both as a period (.) and as its hex equivalent.

When using a parallel interface, the letter "p" before a hex code indicates an active Paper Instruction (PI) line and a blank space before a hex code indicates an inactive PI line.

To obtain a hex code printout, perform the following steps.

NOTE: The asterisks (*) indicate steps specific to using the coax/twinax interface menus which are only displayed when the IBM Coax/Twinax feature is installed. These steps do not apply to the Multi-Platform Interface Coax/Twinax feature.

Step	Key	Result	Notes
1.	Press: Stop	NOT READY	Places the printer in NOT READY mode.
2.	Press: Scroll ↑ + Scroll ↓	OPERATOR MENU UNLOCKED	Press both keys at the same time. Unlocking the Operator Menu allows you to test your printer.
3.	Press: Menu	OPERATOR MENU PRINTER CONTROL	First of the series of configuration menus.

Step	Key	Result	Notes
*	Press: Scroll ↑	OPERATOR MENU COAX INTERFACE OR OPERATOR MENU TWINAX INTERFACE	Moves forward to the COAX INTERFACE or TWINAX INTERFACE option.
4.	Press: Enter	PRINTER CONTROL INTERFACE SELECTION	Moves forward to the INTERFACE SELECTION option.
*		COAX INTERFACE PRINT LANGUAGE OR TWINAX INTERFACE PRINT LANGUAGE	Moves forward to the PRINT LANGUAGE option.
5.	Press: Scroll ↑ UNTIL	PRINTER CONTROL HEX PRINT MODE	Moves forward to the HEX PRINT MODE option.
*		COAX INTERFACE HEX PRINT MODE OR TWINAX INTERFACE HEX PRINT MODE	Moves forward to the HEX PRINT MODE option.
6.	Press: Enter	HEX PRINT MODE DISABLE*	Moves forward to DISABLE, the active option.
7.	Press: Scroll ↑	HEX PRINT MODE ENABLE	Moves forward to ENABLE, the alternate option.
8.	Press: Enter	HEX PRINT MODE ENABLE*	Asterisk (*) indicates this choice is now active.
9.	Press: Stop	NOT READY	Returns the printer to Not READY mode.

Step	Key	Result	Notes
10. Press:	Scroll↑ + Scroll↓	OPERATOR MENU LOCKED	Press both keys at the same time to relock the Operator Menu.
11. Press:	Start	READY	Returns the printer to READY mode.
		HEX DUMP ACTIVE	The message HEX DUMP ACTIVE flashes briefly.

12. A hex code printout results when data is sent to the printer with HEX PRINT MODE enabled. After obtaining the printout, return to normal print mode by disabling HEX PRINT MODE.

> **NOTE:** Printing in Hex Mode may alter prior print attributes set by the host computer. A soft reset or power-off may be required after disabling HEX PRINT MODE.

```
................   OO  O1  O2  O3  O4  O5  O6  O7  O8  O9  OD  OA  OB  OC  OD  OA
................   OE  OF  10  11  12  13  14  15  16  17  18  19  1A  1B  1C  1D
..  ABCDEFGHIJKLM  1E  1F  20  41  42  43  44  45  46  47  48  49  4A  4B  4C  4D
NOPQRSTUVWXYZabc   4E  4F  50  51  52  53  54  55  56  57  58  59  5A  61  62  63
defghijklmnopqrs   64  65  66  67  68  69  6A  6B  6C  6D  6E  6F  70  71  72  73
tuvwxyz~!@#$%^&*   74  75  76  77  78  79  7A  7E  21  40  23  24  25  5E  26  2A
()_+1234567890-=   28  29  5F  2B  31  32  33  34  35  36  37  38  39  30  2D  3D
[]\;',./{}|:"<>?   5B  5D  5C  3B  27  2C  2E  2F  7B  7D  7C  3A  22  3C  3E  3F
................   OD  OA  OO  O1  O2  O3  O4  O5  O6  O7  O8  O9  OD  OA  OB  OC
................   OD  OA  OE  OF  10  11  12  13  14  15  16  17  18  19  1A  1B
....  ABCDEFGHIJK  1C  1D  1E  1F  20  41  42  43  44  45  46  47  48  49  4A  4B
LMNOPQRSTUVWXYZa   4C  4D  4E  4F  50  51  52  53  54  55  56  57  58  59  5A  61
bcdefghijklmnopq   62  63  64  65  66  67  68  69  6A  6B  6C  6D  6E  6F  70  71
rstuvwxyz~!@#$%^   72  73  74  75  76  77  78  79  7A  7E  21  40  23  24  25  5E
&*()_+1234567890   26  2A  28  29  5F  2B  31  32  33  34  35  36  37  38  39  30
-=[]\;',./{}|:"<   2D  3D  5B  5D  5C  3B  27  2C  2E  2F  7B  7D  7C  3A  22  3C
>?..               3E  3F  OD  OA
```

Figure 6–3. Sample ASCII Hex Code Printout

```
PRINTER CONTROL INFORMATION AREA
ADDR    0  1  2  3  4  5  6  7  -  8  9  A  B  C  D  E  F
   0 =  20 04 00 00 00 00 00 00 - 00 00 13 70 1D 10 1C 00
  10 =  04 06 00 50 01 00 03 64 - 00 00 00 00 00 00 00 00
  20 =  00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00
  30 =  00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00
  40 =  00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00

PRINTER BUFFER AREA
ADDR    0  1  2  3  4  5  6  7  -  8  9  A  B  C  D  E  F
  50 =  00 01 02 03 04 05 06 07 - 08 09 0A 0B 0C 0D 0E 0F
  60 =  10 11 12 13 14 15 16 17 - 18 19 1A 1B 1C 1D 1E 1F
  70 =  20 21 22 23 24 25 26 27 - 28 29 2A 2B 2C 2D 2E 2F
  80 =  30 31 32 33 34 35 36 37 - 38 39 3A 3B 3C 3D 3E 3F
  90 =  40 41 42 43 44 45 46 47 - 48 49 4A 4B 4C 4D 4E 4F      ãäàáãaçñ¢.<(+|
  A0 =  50 51 52 53 54 55 56 57 - 58 59 5A 5B 5C 5D 5E 5F      &éãëèíîïìß!$*);¬
  B0 =  60 61 62 63 64 65 66 67 - 68 69 6A 6B 6C 6D 6E 6F      -/ÃÄÀÁÃÇÑ¦,%_>?
  C0 =  70 71 72 73 74 75 76 77 - 78 79 7A 7B 7C 7D 7E 7F      øÉÊËÈÍÎÏÌ`:#@'="

ADDR    0  1  2  3  4  5  6  7  -  8  9  A  B  C  D  E  F
  D0 =  80 81 82 83 84 85 86 87 - 88 89 8A 8B 8C 8D 8E 8F      Øabcdefghi«»ðýþ±
  E0 =  90 91 92 93 94 95 96 97 - 98 99 9A 9B 9C 9D 9E 9F      °jklmnopqrªºæ¸Æ¤
  F0 =  A0 A1 A2 A3 A4 A5 A6 A7 - A8 A9 AA AB AC AD AE AF      µ~stuvwxyz¡¿ÐÝÞ®
 100 =  B0 B1 B2 B3 B4 B5 B6 B7 - B8 B9 BA BB BC BD BE BF      ^£¥•©§¶¼½¾[]‾¨'×
 110 =  C0 C1 C2 C3 C4 C5 C6 C7 - C8 C9 CA CB CC CD CE CF      {ABCDEFGHI-ôöòóõ
 120 =  D0 D1 D2 D3 D4 D5 D6 D7 - D8 D9 DA DB DC DD DE DF      }JKLMNOPQR¦ûüùúÿ
 130 =  E0 E1 E2 E3 E4 E5 E6 E7 - E8 E9 EA EB EC ED EE EF      \÷STUVWXYZ²ôöòóõ
 140 =  F0 F1 F2 F3 F4 F5 F6 F7 - F8 F9 FA FB FC FD FE FF      0123456789³ÛÜÙÚ
```

Figure 6–4. Sample Coax Hex Code Printout

```
0          |          1          |          2          |          3          |          4
00000000000000001111111111111111222222222222222233333333333333334
0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0

0          |          1          |          2          |          3          |
4444444444444445555555555555555666666666666666677777777777777778
123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0
 ãäàáãaçñ¢.<(+|&éãëèíîïìß!$*);¬-/ÃÄÀÁÃÇÑ¦,%_>?øÉÊËÈÍÎÏÌ`:#@'="Ø

0          |          1          |          2          |          3          |
88888888888888889999999999999999AAAAAAAAAAAAAAAABBBBBBBBBBBBBBBBC
123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0
abcdefghi«»ðýþ±°jklmnopqrªºæ¸Æ¤µ~stuvwxyz¡¿ÐÝÞ®^£¥•©§¶¼½¾[]‾¨'×{

0          |          1          |          2          |          3          |
CCCCCCCCCCCCCCCDDDDDDDDDDDDDDDDEEEEEEEEEEEEEEEEEFFFFFFFFFFFFFFFFF
123456789ABCDEF0123456789ABCDEF0123456789ABCDEF0123456789ABCDEF
ABCDEFGHI-ôöòóõ}JKLMNOPQR¦ûüùúÿ\÷STUVWXYZ²ôöòóõ0123456789³ÛÜÙÚ
```

Figure 6–5. Sample Twinax Hex Code Printout

Fault Messages

If a fault condition occurs in the printer, the Attention indicator on the operator panel lights, and the first line of the operator panel message display indicates the fault. The second line of the display indicates how to clear the fault.

Table 6–1 explains each fault message and describes how to correct the fault condition. Displayed faults fall into one of two categories:

- Operator correctable.
- IBM service representative required to correct.

Fault Correction Procedure

Before correcting a fault, read the fault explanation, then proceed to fix the problem, taking the following steps:

1. Press any key except **Form Feed** or **Stop** to silence the alarm if necessary.
2. Write down the number of the error message(s) being displayed.
3. Read the fault explanation, then proceed to fix the problem, if possible.
4. Press **Stop** to clear the fault message. Press **Start** to return to Ready mode, and resume printing.
5. If the fault message reappears, power off the printer, wait 15 seconds, then power on the printer.
6. Run your print job again. If the fault message reappears, turn off power to the printer, then call your IBM service representative. Otherwise, no further attention is required.

The following table explains each fault message and offers suggestions for correcting the fault condition.

Table 6–1. Fault Messages

Fault Message	Operator Correctable?	Explanation	Solution
001 END OF FORMS LOAD FORMS	Yes	Printer is out of paper.	Load paper according to instructions on page 2–43.
002 FORMS JAMMED CLEAR JAM AND RELOAD FORMS	Yes	No paper motion.	Clear paper jam and reload paper. See the *Operator's Guide*. Reset forms thickness lever.
003 FORMS EJECTED PRESS EJECT/RESTORE	Yes	Non-error status message.	Press **Eject/Restore** key to return paper to print position.
004 VIEW FORMS PRESS VIEW KEY	Yes	Non-error status message.	Press **View** key to return paper to print position.
006 HOST SYSTEM REQUEST ATTENTION	Yes	Host attention message.	The host computer or printer controller requires attention.
007 FM HEADER ERROR	No	Format header error. Applications software has violated format header parameters.	Contact your system administrator.
008 HOLD PRINT TIMEOUT PRESS START	Yes	Printer was off-line more than 10 minutes and the "Intervention Required" parameter is set to "Send to Host."	Press **Start** to put printer in READY state.
009 INVALID KEY PRESS	Yes	Appears briefly if an inactive key is pressed in current print mode.	Re-enter the value, or press the correct key.
010 PARAMETER ERROR	No	Illegal parameter value received in command code.	Contact your system administrator.
011 SCS COMMAND ERROR	No	Printer received undefined control character.	Contact your system administrator.
012 STRUCTURED FIELD ERROR	No	Applications software has violated structured data field parameters.	Contact your system administrator.
013 ACTIVATE LOST	No	Printer detects twinax protocol communication errors.	The printer reports the error.

Fault Message	Operator Correctable?	Explanation	Solution
014 INVALID ACTIVATE	No	Printer detects twinax protocol communication errors.	The printer reports the error.
015 COMMUNICATION CHECK CHECK CABLE	Yes	Line not active. (Twinax interface)	Check cable connection.
016 INVALID COMMAND	No	Printer detects twinax protocol communication errors.	The printer reports the error; host action is required.
017 STACKER JAM CHECK STACKER	Yes	Paper is jammed in the power stacker area.	Remove paper.
018 STACKER FULL CHECK STACKER	Yes	Power stacker is full of paper.	Remove paper.
019 STACKER FAULT CHECK STACKER	Yes	Stacker is not functioning correctly	Check for obstructions in the stacker area. If fault persists, contact your IBM service representative.
021 RECEIVE BUFFER OVERRUN VERIFY CONFIGURATION	Yes	Receive overrun. (Serial interface)	Check printer serial port configuration setup. Ensure that baud rate matches both host and printer settings.
022 UNIT ADDRESS NOT RECEIVED CHECK PRINTER ADDRESS	Yes	Unit address not recognized by printer. (Poll timeout, twinax interface)	Ensure that printer address matches host setting.
024 SERIAL LINE PARITY ERROR VERIFY CONFIGURATION	Yes	Parity error. (Serial interface)	Check printer serial port configuration setup. Ensure that parity setting matches both host and printer settings.
025 SERIAL FRAMING ERROR VERIFY CONFIGURATION	Yes	Framing error. (Serial interface)	Check printer serial port configuration setup. Ensure that it matches host setting.
026 HEX DUMP MODE	N/A	Printer attach status message.	No action necessary.
027 COMMUNICATIONS CHECK CALL SYSTEM OPERATOR	Yes	Enable poll timeout. The printer was not enabled for one minute. (Coax interface)	Check cable connection and host system.

Fault Message	Operator Correct-able?	Explanation	Solution
028 COMMUNICATIONS CHECK CALL SYSTEM OPERATOR	Yes	Poll timeout error. The printer was not polled for one minute. (Coax interface)	Check cable connection and host system.
029 8344 DIAGNOSTIC TEST FAILED	No	Link-level code test detects hardware failure.	Contact your IBM service representative.
031 END OF FORMS TIMEOUT LOAD FORMS	Yes	A timeout message is sent to the host if paper is not loaded 10 minutes after **Stop** was pressed to clear the paper out fault.	Load paper. See *Operator's Guide* for procedure.
032 FORMS JAMMED TIMEOUT CLEAR JAM AND RELOAD FORMS	Yes	A timeout message is sent to the host if no paper motion has occurred for 10 minutes after **Stop** was pressed to clear the jam fault.	Clear paper jam and reload paper. See *Operator's Guide* for procedure.
034 RIBBON STALL TIMEOUT CHECK RIBBON	Yes	A timeout message is sent to the host if no ribbon movement has occurred 5 seconds if **Stop** was not pressed to clear the fault.	Make sure the ribbon is not twisted and the forms thickness lever is set to match thickness of media being used. If fault reoccurs, contact your IBM service representative.
037 STACKER JAM TIMEOUT CHECK STACKER	Yes	A timeout message is sent to the host if paper is not loaded 10 minutes after **Stop** was pressed to clear the stacker jam fault.	Clear stacker jam and reload paper. See *Operator's Guide* for procedure.
038 STACKER FULL TIMEOUT CHECK STACKER	Yes	A timeout message is sent to the host if paper is not loaded 10 minutes after **Stop** was pressed to clear the stacker full fault.	Remove paper from the stacker.
039 STACKER FAULT TIMEOUT CHECK STACKER	Yes	A timeout message is sent to the host if paper is not loaded 10 minutes after **Stop** was pressed to clear the stacker fault.	Check for obstructions in the stacker area. If fault persists, contact your IBM service representative.
041 BUFFER OVERFLOW	Yes	Host sends data after the printer buffer is full. (Serial interface.)	Check printer serial port configuration setup. Ensure that the Data Terminal Ready setting matches both host and printer settings.

Fault Message	Operator Correctable?	Explanation	Solution
042 CUSTOM SET DOES NOT EXIST SAVE FIRST	Yes	This custom configuration set does not exist.	Save the custom set. Refer to page 3–20, "Saving Your Configuration in a Custom Set."
043 CUSTOM SET ALREADY EXISTS DELETE FIRST	Yes	Custom set is write-protected.	Delete existing set, then save new set. Refer to page 4–19 "Delete Custom Set."
044 EC FIRMWARE/HARDWARE ERROR	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
046 EC STOPPED AT STATE <state>	No	Controller self-test and initialization sequence was halted at <state>, where <state> is one of 10 numerically coded messages.	Contact your IBM service representative.
056 HAMMER COIL OPEN	No	Electrical malfunction of one or more hammer coils.	(You can continue to print with degraded print quality.) Contact your IBM service representative.
057 CLOSE PLATEN	Yes	Forms thickness lever is raised to the open position.	Lower the forms thickness lever.
058 SHUTTLE JAM SEE SETUP GUIDE	No	No shuttle movement or the shuttle is moving at the wrong speed.	Make sure the ribbon is not twisted and the forms thickness lever is set correctly. If the fault reoccurs, contact your IBM service representative.
059 CANCEL PRINT ACTIVE	N/A	Non-error status message.	No action necessary.
060 PRINTER HOT	No	Controller board sensors report high temperatures on the board.	Contact your IBM service representative.

Fault Message	Operator Correct-able?	Explanation	Solution
062 EXHAUST FAN FAULT	Yes	Sensors cannot detect current in fan circuit.	Power off the printer and remove paper guide assembly (for instructions, refer to your *6400 Maintenance Information Manual)*. Check that the fan cable is connected. Check for obstruction of vents and fan airway; remove any obstructions. Check for items beneath the printer blocking cabinet vents. Power back on the printer. If this message reoccurs, contact your IBM service representative. **NOTE:** This message should not appear on a Pedestal model. If this message does appear, contact your IBM Service Representative.
065 HAMMER BANK FAN FAULT	Yes	Sensors cannot detect current in fan circuit.	Power off the printer and remove paper guide assembly (for instructions, refer to your *6400 Maintenance Information Manual)*. Check that the fan cable is connected. Check for obstruction of vents and fan airway; remove any obstructions. Check for items beneath the printer blocking cabinet vents. Power back on the printer. If this message reoccurs, contact your IBM service representative.
069 DATA CLEARED	N/A	Appears when data is cleared out of printer after **Cancel** key has been pressed.	No action necessary.
080 POWER SUPPLY HOT	No	Circuits are overheating on the power supply board.	Contact your IBM service representative.
082 POWER SUPPLY 8.5V FAILED	No	Internal power failure.	Contact your IBM service representative.

Fault Message	Operator Correctable?	Explanation	Solution
083 INTAKE FAN FAULT	Yes	Sensors cannot detect current in fan circuit.	Power off the printer and remove paper guide assembly (for instructions, refer to your *6400 Maintenance Information Manual)*. Check that the fan cable is connected. Check for obstruction of vents and fan airway; remove any obstructions. Check for items beneath the printer blocking cabinet vents. Power back on the printer. If this message reoccurs, contact your IBM service representative.
084 POWER SUPPLY 48V FAILED	No	Internal power failure.	Contact your IBM service representative.
085 CONTROLLER VOLTAGE	No	Controller voltage failure.	Contact your IBM service representative.
086 CONTROLLER 15V	No	Controller voltage failure.	Contact your IBM service representative.
087 PLATEN OPEN TIMEOUT CLOSE PLATEN	Yes	Forms thickness lever has been open for at least one minute.	Close forms thickness lever.
088 CONTROLLER 23.5V	No	Controller voltage failure.	Contact your IBM service representative.
089 RIBBON STALL CHECK RIBBON	Yes	No ribbon movement.	Make sure the ribbon is not twisted and the forms thickness lever is set to match thickness of media being used. If fault reoccurs, contact your IBM service representative.
090 SHUTTLE COVER OPEN CLOSE SHUTTLE COVER	No	Shuttle cover is missing, damaged, or not correctly installed.	Contact your IBM service representative.
092 RIBBON DRIVER CIRCUIT	No	Controller board does not detect ribbon drive motor.	Contact your IBM service representative.
101 UPPER DRIVER SHORT	No	Hammer driver circuits on the controller board shorted to ground.	Contact your IBM service representative.

Fault Message	Operator Correctable?	Explanation	Solution
102 LOWER DRIVER SHORT	No	Circuit(s) on the hammer bank or in the hammer bank power cable shorted to ground.	Contact your IBM service representative.
107 HAMMER COIL HOT	No	One or more hammer coils are overheating.	Stop printing and allow the printer to cool for five minutes. If the fault reoccurs, contact your IBM service representative.
110 STACK OVERFLOW SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
111 STACK UNDERFLOW SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
112 UNDEFINED OPCODE SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
113 PROTECTED INSTRUCTION SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
114 ILLEGAL OPERAND ACCESS SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
115 ILLEGAL INSTRUCTION ACCESS SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
116 ILLEGAL EXTERNAL BUS ACCESS SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
117 A TO D OVERRUN SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
118 UNDEFINED INTERRUPT SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
119 TCB CORRUPTED SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
120 ACCESS NULL POINTER SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.

Fault Message	Operator Correct-able?	Explanation	Solution
121 PAPER NOT AT SPEED SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
122 PAPER NOT SCHEDULED SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
123 PAPER BUSY TOO LONG SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
124 PAPER FIFO OVERFLOW SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
125 PAPER FIFO UNDERFLOW SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
126 PAPER FEED BAD TABLE SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
127 PAPER FEED ILLEGAL STATE SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
128 PAPER FEED INVALID COMMAND SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
129 PAPER FEED INVALID PARAMETER SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
130 PAPER FEED PARTLY ENERGIZED SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
131 PAPER FEED INTERRUPT SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
132 RIBBON INVALID COMMAND SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
133 RIBBON INVALID STATE SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.

Fault Message	Operator Correctable?	Explanation	Solution
134 PLATEN INVALID COMMAND SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
135 PLATEN INVALID STATE SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
136 PLATEN INVALID PARAMETER SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
137 SHUTTLE INVALID COMMAND SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
138 SHUTTLE INVALID PARAMETER SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
139 SHUTTLE OVERSPEED SEE USER'S GUIDE	No	Fatal firmware error on the controller board.	Contact your IBM service representative.
990 MACHINE CHECK	N/A	Host status message.	No action necessary.
NON-VOLATILE MEMORY FAILED	No	Non-volatile memory fault.	Contact your IBM service representative. NOTE: You can still print, but you cannot save configuration changes as the NVRAM is defective.
A97 GRAPHIC CHECK ERROR PRESS STOP THEN START	Yes	Printer has received a non-printable character.	Press **Stop** then **Start**.
ENERGY SAVER MODE ACTIVE	N/A	Status message: printer is in low-energy idle state, all fans and higher voltages are off, only +5Vdc logic circuits are active.	No action necessary. NOTE: If the printer was in NOT READY state when the energy saver mode was activated, it will remain in the NOT READY state until the **START** key is pressed.
HAMMER COIL BAD #, #, #	No	Malfunction of one or more hammer coils.	(You can continue to print with degraded print quality.) Contact your IBM service representative.
NOT READY	N/A	Printer state message: printer is offline, not in communication with host.	No action necessary.

Fault Message	Operator Correctable?	Explanation	Solution
OPERATOR MENU <first menu item>	N/A	Non-error status message.	No action necessary.
OPERATOR MENU LOCKED	N/A	Non-error status message.	No action necessary.
OPERATOR MENU UNLOCKED	N/A	Non-error status message.	No action necessary.
PA1 SELECTED	N/A	Attach status message.	No action necessary.
PA2 SELECTED	N/A	Attach status message.	No action necessary.
P05 DIAGNOSTIC TEST PASSED	N/A	Non-error status message.	No action necessary.
P17 SECURITY VIOLATION	No	Security code of PAL on controller board does not match code of firmware on the controller board.	Contact your IBM service representative.
PLEASE WAIT... RESET IN PROGRESS	N/A	Printer reset in progress.	No action necessary.
READY	N/A	Printer state message: printer is online and in communication with host.	No action necessary.
RIBBON INK OUT CHANGE RIBBON	Yes	RibbonMinder has determined that the ribbon is out of ink.	Replace the ribbon and verify ribbon life is reset to 100%.
SERVICE MENU <first service test>	N/A	Non-error status message.	No action necessary.
TESTING HARDWARE PLEASE WAIT	N/A	Status message when printer runs self-tests and initialization routines.	No action necessary.
TOP OF FORM SET	N/A	Non-error status message.	No action necessary.

7 **RibbonMinder**

Chapter Contents

Overview

RibbonMinder is a user definable software feature that determines when a ribbon should be changed. It does this by monitoring ink consumption and alerts you when the print quality may fall below a level that you designate. This is especially important if you are printing bar codes to be scanned. This chapter explains how RibbonMinder works and how to configure it to meet your specific print job requirements.

Like the fuel gauge in your car, RibbonMinder indicates how much usable ink remains in the ribbon. The "gauge" for RibbonMinder is the message display on the control panel. The following message is typical for a new ribbon (100% full):

```
READY     100%
```

As printing continues, the percentage of usable ink in the ribbon decreases (percentage ranges from 100% through –99%):

```
READY      74%
```
Ribbon ink being consumed

```
READY       8%
```
Ribbon life approaching end

When 0% usable ink appears, the printer is typically configured to stop printing and display the following message:

```
RIBBON OUT OF INK
CHANGE RIBBON
```

Continue with the next sections for configuring RibbonMinder options.

Configuring the RibbonMinder

This section explains how to unlock the PROGRAM MODE, find the RibbonMinder options, make changes, exit the configuration menu, and lock the PROGRAM MODE.

Following this section is a procedure for changing the Ribbon Size option of RibbonMinder.

NOTE: All RibbonMinder options are automatically saved in NVRAM when selected.

As you perform the following steps, refer to the RibbonMinder menu diagram shown in Figure 7–1.
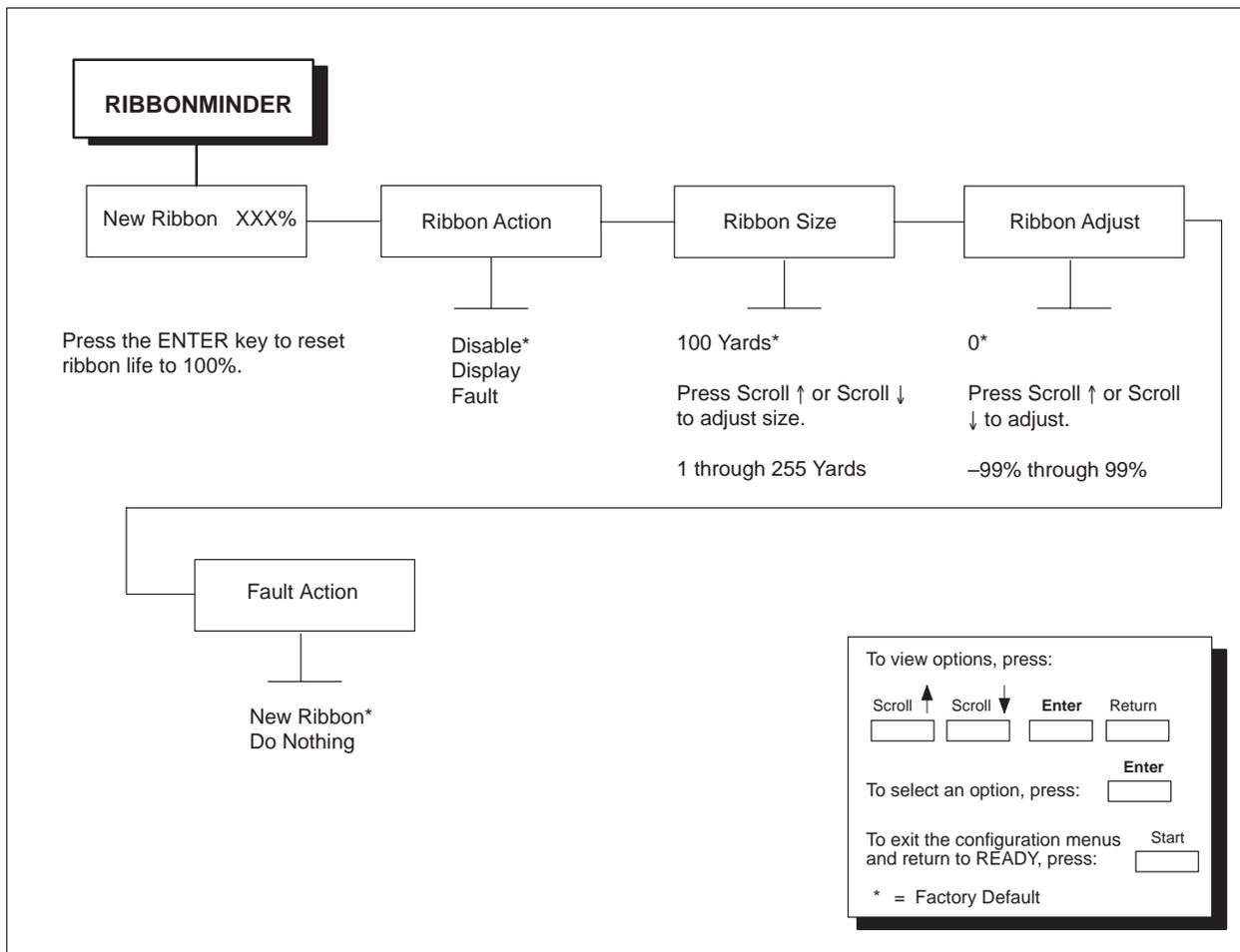
Figure 7–1. RibbonMinder Menu Diagram

Step	Key	Result	Notes
1. Press:	Stop	NOT READY	Places the printer in NOT READY mode.
2. Press:	Scroll ↑ + Scroll ↓	OPERATOR MENU UNLOCKED	Press both keys at the same time. Unlocking the Operator Menu allows you to change the configuration.
3.	Menu	OPERATOR MENU PRINTER CONTROL	
4.	Scroll ↑ or Scroll ↓	OPERATOR MENU RIBBONMINDER	
5.	Enter	RIBBONMINDER NEW RIBBON	
6.	Scroll ↑	Ribbon Size 60 Yards *	Scroll through to find Ribbon Action, Ribbon Size, Ribbon Adjust, Fault Action
7.	Scroll ↑	Ribbon Size 100 Yards	Allows you to adjust desired option.
8. Press	Enter	Ribbon Size 100 Yards*	Selects option value.
9.	Scroll ↑ or Scroll ↓	OPERATOR MENU UNLOCKED	Exits the menu.
10.	Start	READY	Returns the printer to the READY mode.
11.	Close the printer cover. You can resume printing.		
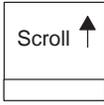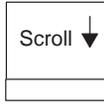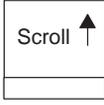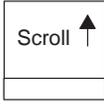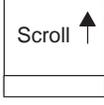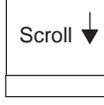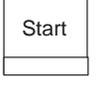
Running a Job

Once you have set up options for RibbonMinder, it works without attention. When you begin printing with RibbonMinder enabled and Ribbon Action set to DISPLAY, the message display shows a ribbon life value of 100%. The ribbon life decreases as the ink is consumed.

New Ribbon

The New Ribbon option provides information concerning the percentage of ribbon used and allows you to reset the ribbon life when you replace a worn ribbon. To reset the ribbon life from the operator panel, press **Enter** while this option is displayed. It may be necessary to replace ribbons *before* the ink has been depleted (e.g. when the ribbon has been snagged, folded, or otherwise damaged).

Ribbon Action

A fault message displays when the ink consumption reaches 0%.The Ribbon Action option allows you to perform any of the three following functions:

- DISABLE does not display the RibbonMinder ink consumption percentage. The percentage is calculated but not displayed.
- DISPLAY allows you to view the RibbonMinder ink consumption display. A fault message displays when the ink consumption reaches 0%.
- FAULT displays an error message, which is Ribbon Ink Out, Change Ribbon, when the RibbonMinder consumption percentage falls below zero. The error message can be cleared and printing can continue for approximately another two minutes.

  After the two-minute period has elapsed, the fault will reoccur if the Ribbon Action remains set on FAULT. If the Ribbon Action is changed to DISABLE or DISPLAY within the two-minute period, the fault will not reoccur.

If you do not want to change the ribbon at this time, you may disable RibbonMinder. If the ribbon is worn, the "Change Ribbon" message will reappear once the function is enabled again until the ribbon is changed. If a fault message is displayed on the control panel and the Ribbon Fault is set to New Ribbon, the ribbon percentage automatically resets back to 100% when the ribbon is changed.

If the message display indicates the need to install a new ribbon and your print job is one page short of completion, press **Stop** and then **Ready** to clear the fault and print the last page. Otherwise, you may continue your print job at the end of this procedure. The fault will occur again two minutes after clearing the fault.

Ribbon Size

RIBBON SIZE specifies the length of the ribbon installed. When installing or replacing a ribbon, you can adjust the ribbon size by using the Ribbon Size option.

The default ribbon size is 100 yards. The size can be adjusted from 1 through 255 yards.

Pressing the Scroll ↑ key increases the ribbon size, while pressing the Scroll ↓ key decreases the ribbon size.

Ribbon Adjust

RIBBON ADJUST allows the printing of more or less pages before the display reaches 0%.

The adjustment is a percentage of the default (0%) and ranges from –99% through 99%. For example, if the printer ordinarily printed 1000 pages at the default setting (0%), by setting the adjustment to 10% it would print 1100 pages (1000 + 10%) before the display reached 0%. Likewise, if the adjustment was set to –20%, it would print 800 pages (1000 – 20%) before the display reached 0%.

Pressing the Scroll ↑ key increases the percentage, while pressing the Scroll ↓ key decreases the percentage.

Fault Action

FAULT ACTION selects the way the fault message will be reset.

- New Ribbon (the default) the Ribbon Out of Ink, Change Ribbon fault will be reset when the platen is opened. Opening the platen will also reset the ribbon life to 100%.

- Do Nothing, the ribbon life may only be reset using the new ribbon menu option.

A Printer Specifications

Contents

Ribbon Specifications

NOTE: The ribbon life figures listed below are based on IBM tests conducted in accordance with ANSI Standard X3A.182. Actual ribbon life may vary depending upon the user's quality criteria, printer condition, machine settings, paper quality, and bar code requirements. Label yield depends on label format, bar code symbology, and other parameters. Label yield with high–performance scanning equipment may exceed these yields. Use only the ribbons listed below.

IBM General Purpose Ribbon (60 yd.)　　P/N 1040990
Used for general text printing such as data and word processing.
Average yield: 20 million DP characters

IBM General Purpose Ribbon (100 yd.)　　P/N 1040995
Average yield: 30 million DP characters

IBM High Contrast Ribbon (60 yd.)　　P/N 1040993
Used for general text printing as well as OCR, graphics and bar code printing.
Average yield: 20 million DP characters, 2500 AIAG–B3 labels with visible light source scanning equipment, or 1300 AIAG–B3 labels with infrared light source scanning equipment.

IBM High Contrast Ribbon (100 yd.)　　P/N 1040998
Average yield: 30 million DP characters, 3600 AIAG–B3 labels with visible light source scanning equipment, or 1800 AIAG–B3 labels with infrared light source scanning equipment.

Ordering Ribbons (U.S. Only)

Ribbons may be purchased from Lexmark Authorized IBM Supplies Dealers or directly from Lexmark by calling: **1–800–438–2468**.

Fax orders may be sent to: **1–800–522–3422**
Mail orders may be sent to: Lexmark International, Inc., 1221 Alverser Drive, Midlothian, VA 23113.

Ordering Ribbons (Outside of U.S.)

Order supplies by contacting your local Lexmark International distributor or by writing to Lexmark International, Inc.
Lexmark International, Inc.
P.O. Box 11427
Lexington, KY, 40575–1427 USA

Paper Specifications

NOTE: The following paper specifications are general guidelines. Paper stock should be tested with applications to determine print quality.

Paper

Type:	• Edge–perforated, fan–fold, 3 to 17 inches (7.62 to 43.18 cm) wide*, 2 to 24 inches (5.08 to 60.96 cm) long**
	• Single–part: 15 pound (57 g/m^2) to 100 pound (377 g/m^2) stock.
	• Multi–part carbon: 1– to 6–part forms, maximum 12 pound (45 $g/m^{2)}$ ply of upper plies.
	• Multi–part carbonless, maximum of 6–part forms. Test readability of greater than 4–part forms.
Form Thickness:	0.025 inches (0.064 cm) maximum
Drive:	Adjustable tractors (6–pin engagement)

Slew Rate:	Fast	Slow
6400–050	12 ips	8 ips
6400–P50	12 ips	8 ips
6400–010	20 ips	8 ips
6400–P10	16 ips	8 ips
6400–015	20 ips	10.4 ips
6400–015 w/Stacker	25 ips	10.4 ips

Labels

On Backing:	One–part continuous perforated fan–fold back form. Labels must be placed at least 1/6 inch (0.42 cm) from the fan–fold perforation. Backing adhesive must not be squeezed out during printing.
Sheet Size:	3 to 17 inches (7.62 to 43.18 cm) wide*, including the two standard perforated tractor feed strips. A maximum sheet length of 16 inches (40.64 cm) between top and bottom perforations.**

| Thickness | Not to exceed 0.025–inch (0.064 cm), including backing sheet. |

*On pedestal models, when using the rear paper exit, the maximum form width is 16 inches (40.64 cm).

**On cabinet models, forms longer than 12 inches can be used by opening the front and rear printer doors.

Printer Dimensions and Weight

Cabinet Models

Height:	41 inches (103.3 cm)
Width:	27 inches (68.6 cm)
Depth:	29 inches (73.7 cm)
	32.5 inches (82.6 cm) with power stacker
Weight:	225 lbs. (102.1 kg) unpacked
	246 lbs. (107.8 kg) unpacked with power stacker
	285 lbs. (129.3 kg) packed
	306 lbs. (135 kg) packed with power stacker

Pedestal Models

Height:	35.5 inches (90.2 cm)
Width:	24.6 inches (62.5 cm)
Depth:	30 inches (76.2 cm)
Weight:	120 pounds. (54.4 kg) unpacked
	160 pounds. (72.6 kg) packaged

Environmental Characteristics

Temperature

Operating:	50° to 104° F (10° to 40°C)
Storage:	–40° to 158° F (– 40° to 70°C)

Relative Humidity

Operating:	10% to 90% (noncondensing)
Storage:	5% to 95% (noncondensing)

Acoustic Noise Level

	Cabinet Models		Pedestal Models	
Acoustic Noise Levels per ISO 9296	050 010	015	P50	P10
Printing	50 dB	52 dB	62 dB	66 dB
	6.7 Bel	7.0 Bel	7.8 Bel	8.2 Bel
Standby	46 dB	46 dB	46 dB	46 dB
	6.3 Bel	6.3 Bel	6.3 Bel	6.3 Bel
Geraeuschemission nach ISO 9296				
Druckend	50 dB	52 dB	62 dB	66 dB
	6.7 Bel	7.0 Bel	7.8 Bel	8.2 Bel
Betriebsbereit	46 dB	46 dB	46 dB	46 dB
	6.3 Bel	6.3 Bel	6.3 Bel	6.3 Bel

NOTE: Cabinet model noise levels listed are with the cabinet doors closed. Levels will be higher if the doors are open.

Pedestal model noise levels listed are for rear paper exit. Levels will be higher for top paper exit.

Electrical Characteristics

Input Voltage

Line Voltage Design Range	Line Frequency	RMS Current		
		500 LPM	**1000 LPM**	**1500 LPM**
88–140 V RMS	47–63 Hz	6A @ 88 V	6A @ 88 V	8A @ 88 V
178–270 V RMS	47–63 Hz	3A @ 178 V	3A @ 178 V	5A @ 178 V

Power Consumption

6400–050
6400–P50

120 VAC 60 Hz	Operating DP Mode		Standby	
	All H's	**Max Typical**	**Not Energy Star**	**Energy Star**
Watts	210	180	80	21
BTU/Hour	720	620	275	75
VA	300	270	120	36

220 VAC 50 Hz	Operating DP Mode		Standby	
	All H's	**Max Typical**	**Not Energy Star**	**Energy Star**
Watts	210	170	80	22
BTU/Hour	720	580	275	75
VA	340	280	130	41

6400–010
6400–P10

120 VAC 60 Hz	Operating DP Mode		Standby	
	All H's	Max Typical	Not Energy Star	Energy Star
Watts	300	240	80	25
BTU/Hour	1025	820	275	85
VA	530	400	140	48

220 VAC 50 Hz	Operating DP Mode		Standby	
	All H's	Max Typical	Not Energy Star	Energy Star
Watts	290	230	80	25
BTU/Hour	990	790	275	85
VA	600	450	150	55

6400–015

120 VAC 60 Hz	Operating DP Mode		Standby	
	All H's	Max Typical	Not Energy Star	Energy Star
Watts	440	330	90	27
BTU/Hour	1500	1130	310	92
VA	740	550	160	50

220 VAC 50 Hz	Operating DP Mode		Standby	
	All H's	Max Typical	Not Energy Star	Energy Star
Watts	420	320	90	27
BTU/Hour	1440	1095	310	92
VA	830	600	170	58

Interfaces

Type:	Three resident parallel, two resident serial, two optional coax, two optional twinax, Ethernet
Logic Levels:	TTL/EIA–232–E, EIA–422–B
Data Format:	ASCII
Compatibility:	EIA–232–E, EIA–422–B, PC Parallel, Dataproducts, IEEE 1284, Twinax, Coax, Ethernet
Transfer Rates:	Up to 200K bytes/sec on parallel interfaces Up to 115,200 baud on serial interfaces
Buffer:	16 kilobytes on serial interfaces 16 kilobytes on parallel interfaces

Cables

A power line cord is provided with the printer, but no data cables. The following provides data cable requirements and ordering information.

ASCII Serial/Parallel: The 6400 printer is connected to personal computers and controllers via industry standard EIA–232–E and PC–parallel printer cables. For Dataproducts interfaces, you will need to obtain a Dataproducts cable. Contact your IBM service representative to order the following:

- EIA–232–E Cable
- PC–Parallel Cable
- Dataproducts Adapter Feature

AS/400: The 6400 is connected to the AS/400 ASCII Workstation Controller via the following IBM cables, available through your IBM service representative:

- 20 ft. RS–232
- 40 ft. RS–232

RISC System/6000: For RS–232 attachment to the IBM RISC System/6000, the following are required:

- IBM Async cable EIA–232/V.24
- Printer/terminal interposer EIA–232
- Serial Cable Kit (PN 12H1204)

Coax/Twinax Interface Feature: Contact your IBM service representative for attachment requirements.

Printing Rates

The printing speed of text is measured in lines per minute (lpm), and is a function of the selected font and the vertical dot density. Printing speed is independent of the number of characters configured in the character set repertoire. Print rates for lines containing attributes such as bold or emphasized printing, superscripts, subscripts, or elongated attributes will decrease to not less than half the rates of the font without such attributes. The exact print rate of lines containing these attributes depends on the specific print job, but software maximizes the throughput by dynamically determining which dot rows contain adjacent dots and must be printed in two strokes. The table below lists typical printing rates.

The reverse paper feed capability allows the printing of multiple densities on a single line. This is useful in printing forms and text together or in mixing different fonts on a print line. Use of multiple densities and reverse paper feed also affects throughput.

6400 Nominal Print Rates

Print Quality Dot Density (DPI)	Characters per Inch	Dot Matrix	PERFORMANCE								
			UPPERCASE ONLY LPM			DESCENDERS & UNDERLINE LPM			PLOT MODE IPM		
Note 1		Note 2	500	1000	1500	500	1000	1500	500	1000	1500
Correspondence 90 (180) X 96	10 12 15	7(13)X9+3 6(11)X9+3 (9)x9+3	200	400	600	155	306	459	21	42	61
Data Processing 60 (120) X 72	10 12 13.3 15 17.1	5(9}X7+2 4(8)X7+2 4(8)X7+2 3(5)X7+2 3(5)X7+2	375	750	1125	300	600	900	42	83	127
High Speed 60 (120) X 48	10 12 13.3	5(9)X5+1 4(7)X5+1 4(7)X5+1	500	1000	1500	428	865	1284	62	124	186
Note 1	A (B) X C, where:		A is maximum horizontal dot density B is horizontal dot placement density C is vertical dot density								
Note 2	D (E) X F +G , where:		D is maximum number of dots that may be placed on E horizontal positions F is number of vertical dots for uppercase symbols G is number of dots available for descenders								

B A Quick Look at Line Matrix Printing

Contents

Character Formation

The IBM 6400 is an impact printer: it creates characters by printing ink dots on paper. Dots overlap to produce a solid-appearing character of uniform density. The dots are made by an assembly of steel hammers mounted on a rapidly oscillating shuttle. The hammers strike the paper through a moving ink ribbon. The dot patterns of characters are mapped in printer memory on invisible matrices, as shown in Figure B–1.
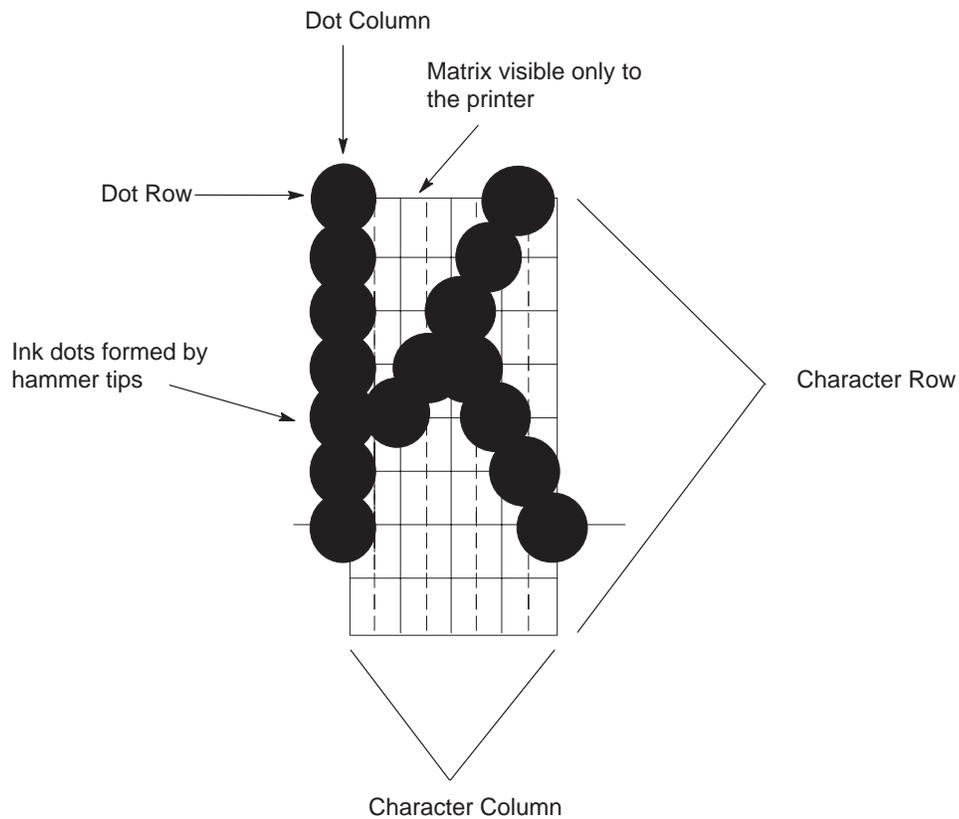
Figure B–1. Typical Character Formation

Serial matrix printers use a moving printhead with pins to form single characters sequentially along the printed line. Unlike serial matrix printers, line matrix printers divide every printable line into *horizontal* dot rows, then print a dot row of the entire line at every lateral sweep of the shuttle. The IBM 6400 is a *line* matrix printer.

During each sweep of the shuttle, hammers are activated to print dots at the required positions in the dot row. When the shuttle reaches the end of a sweep, it reverses direction, and the paper advances one *dot* row. The hammers print the next row of dots as the shuttle sweeps in the opposite direction, as shown in Figure B–2, unless unidirectional printing is chosen.

After a line of characters is printed, the paper advances to the first dot row of the next print line. This creates a number of blank rows between lines of characters, depending on the print mode and line spacing you selected.

*   Used for lowercase descender only
* * Used for underline and lowercase descender
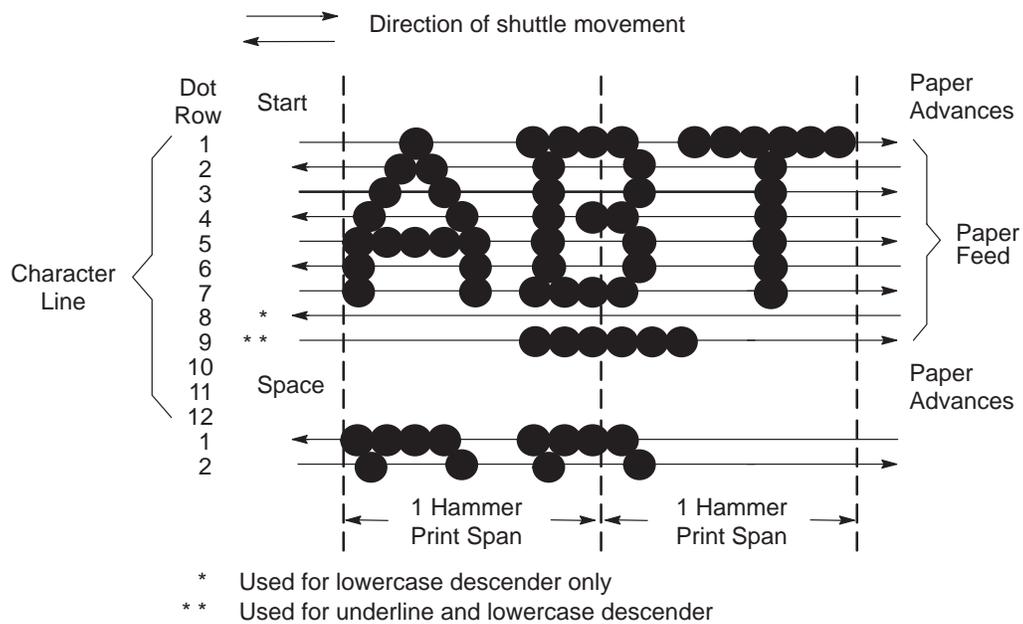
Figure B–2. Line Matrix Printing

Printing Speed

The speed of text printing is measured in lines per minute (lpm). This speed is dependent upon the number of dot rows required to produce a line of characters, regardless of the number of characters in the line. Because more dot rows are required to print lowercase characters with descenders, those character lines will print at a fractionally lower rate.

In addition to character printing, the printer can plot dot-addressable graphic images. The speed of graphics plotting is measured in inches per minute (ipm). Unidirectional plotting can produce better print quality and takes about twice as long as bi-directional plotting. You can select either plotting mode from the operator panel or from the host computer.

Printing rates also vary according to the print quality you select. For example, if you select the Near Letter Quality (NLQ) option, the printer uses more dot rows and slower print strokes to form characters than if you choose the Draft Quality option. Character formation and print speed are faster in Draft Quality because the printer uses fewer dot rows to form characters.

Printing rates are listed in Appendix A, "Printer Specifications."

C Host Attachment

Contents

Host Attachment

The following paragraphs provide information that will help you plan your attachment of this printer to your system. (Refer to Table C–1 for special system requirements.)

This printer attaches to the following host devices and workstations:

- AS/400 ASCII Workstation Controller port 9402 (except Model Y10), 9404, and 9406
- 3174 Controller–Asynchronous Emulation Adapter
- IBM Personal Computer and PS/2 Systems–ASCII Serial or Parallel port
- IBM Personal Computer compatible systems–ASCII Serial or Parallel port
- IBM RISC System/6000–ASCII Serial or Parallel port
- Extended System/9370 ASCII Subsystem
- Micro Channel 370–ASCII Serial or Parallel port
- Non–IBM systems that support ASCII attachments through the following interfaces: EIA–232–E Serial, EIA–422–B Serial, PC Parallel, Dataproducts Parallel, and IEEE 1284 Parallel
- Ethernet and Token Ring LANs via the Network Print Server features.
- Ethernet LANs via the 6400 Ethernet feature.

NOTE: When a coax/twinax feature is installed, it attaches to host devices and workstations that support coax/twinax.

Table C–1. Operating System Support

Operating Systems Supported	Special Notes/Requirements
AIX	• Supported by Version 3.1.5 or later.
AS/400*	• Printer attachment: ASCII Workstation Controller on 9402 (except Model Y10), 9404 and 9406 • Model 9402 (except Model Y10) supported by Version 3.0, models 9404 and 9406 supported by Version 2.0 or later. • Also supported by PC Support/400, Version 2, Release 3.0. • Also supported by OS/400 Version 2, Release 3 Host Print Transform and OS/400 Version 2, Release 2.
MS–DOS**	• Supported by Version 3.3 or later. • Also supported by Microsoft Windows Version 3.0 or later.
OS/2*	• Supported by: OS/2 Version 2.1 or later, OS/2 LAN Server Version 1.0, OS/2 Extended Services Version 2.1, and OS/2 Communications Manager Version 1.0.
System 370 and 390 (MVS, VM and VSE Environments)	• Existing non–graphics printing applications for the IBM 4234 (Model 001) and IBM 3262 (Models 3, 13) are supported and can be used with this printer. • Supported by 3174 with AEA release A5.4 or later, Release B4.0 or later, and Release C1.1 or later.

Continued on next page

Operating Systems Supported	Special Notes/Requirements
Other Operating Systems	• Supported by other operating systems through attaching this printer to the following interfaces: EIA–232–E Serial, EIA–422–B Serial, PC Parallel, Dataproducts Parallel, and IEEE 1284 Parallel. • When attaching this printer to a Digital Equipment Corporation** VAX machine, the preferred attachment is through EIA–232–E serial interface.

NOTE: For more specific information, refer to either the *6400 ASCII Programmer's Reference Manual,* or the *6400 Coax/Twinax Programmer's Reference Manual.*

Compatibility and Limitations

The following are some compatibility and limitation considerations you should be familiar with before attaching this printer with your system.

Compatibility

- The Proprinter III XL emulation is very similar to the datastream used by the IBM 4202–003 Proprinter but contains more features. This protocol enables this line matrix printer to closely emulate a moving–head serial matrix printer but does not support downloaded fonts. In addition, NLQ compresses to 17.1 CPI, not 20 CPI.

- The Epson–FX emulation does not support downloaded characters or print justification. In addition, near letter quality (NLQ) compresses to 17.1 CPI not 20 CPI.

- For Printronix P–Series emulation, differences in supported fonts and control codes may exist between the IBM 6400 and Printronix printers. Downloaded character overlays and downloaded character sets are not supported. Detailed information on supported fonts and control codes can be found in the *6400 ASCII Programmer's Reference Manual.*

- For Printronix P–Series XQ Variant, the IBM 6400 only prints condensed print at 15 CPI, like the Printronix P600, but unlike the P300, which printed condensed print at either 13.3 or 16.7 CPI.

- Emulation differences may exist between the IBM 6400 with Epson FX 1050 emulation and the Printronix MVP 150B, which used the Epson MX emulation.

- Application differences may exist between the IBM 6400 and the Printronix MVP–150C printers due to additional print quality modes which the 6400 does not support.

- Printronix printers with an "L" in the model design indicate the printer has the capability to print smaller dots. The IBM 6400 will print text–only applications that were printed by L–Series printers. Applications requiring the printing of anything other than text will not be supported.

- DAVFU, DVFU, NVFU and CVFU Vertical Format Units, along with the optional uses of the Serial Data Bit 8, are not supported.

- Printronix P6XX0 models using older C1 controllers, which are primarily installed in Europe, are not supported.

- The following printers, which are similar to Printronix printers, are not supported by the IBM 6400 printer: KPG Panda, TRILAx (Trilog Inc.) and Gentry REVerse Paper Feed.

- The IBM 6400 does not support compatibility with the Printronix P1013 or the P4160.

- Printronix printers with the following interfaces are not supported: S/370 Channel Attachment (Printronix P9012), QMS** 2780 or 3780 Bisync–to–ASCII attachment, RS–232 as Current Loop, and Dataproducts Long Lines.

Limitations

- Forms length maximum of 24 inches. In the cabinet models, forms longer than 12 inches can be accommodated by opening the front and rear doors.

- Maximum forms width of 17 inches (including tear strips) or 16 inches (without tear strips).

- Use 15 to 100 pound (6.8 to 45.36 kg) stock with a maximum thickness of 0.025 inches (0.0635 cm).

- Maximum print line of 13.6 inches.

- Friction feed paper handling is not supported.

- Use of high speed (Draft mode) fonts using greater than 15 CPI for critical applications should be tested, prior to production use, using your application to determine if the output is satisfactory.

- Processing of forms with black or dark colored backing, or forms with see–through plastic or cellophane covered openings or windows may give false End–of–Forms (EOF) signals. Request For Price Quote (RPQ) S02392 (factory–installed) or S02394 (field–installed) may be ordered to provide a modified EOF switch to handle these types of forms. Contact your IBM Sales Representative or IBM Authorized Remarketer.

- Downloaded characters are not supported in Proprinter, Epson, P–Series, P–Series XQ Variant, or Printronix Serial Matrix emulations.

- Due to the variation in carbonless forms, you should test forms with four or more parts for readability prior to production use. Carbonless forms can be affected by storage and other environmental conditions and should be tested periodically from your application to make sure the output meets your requirements.

- Compatibility differences may exist when replacing or coexisting with older printers due to technology differences, product and application customization, and emulation differences.

- The IBM Coax/Twinax feature will not support P–series or EVFU control codes coming from the host. The IBM Coax/Twinax feature may not be compatible with some older applications running on an installed Printronix printer. In that case, the Multi–Platform Interface Coax/Twinax feature should be installed.

- The coaxial portion of the IBM Coax/Twinax feature of this printer is subject to the following limitations:

    Minimum dot matrix of 9 wide by 8 high

    Minimum dot matrix of 4 or 7 wide by 8 high

NOTE: The following features are not supported:

    IBM 3287 Models 1C and 2C

    Programmed symbols 2 and 4, 190 character downloadable fonts

    Data analysis = APL feature

    Graphic escape

- The twinaxial portion of the IBM Coax/Twinax feature of this printer is subject to the following limitations:

    Minimum dot matrix of 9 wide by 8 high

    Minimum dot matrix of 4 or 7 wide by 8 high

    Print lines greater than 198 characters

- IBM 6400 vs 4234 IPDS Comparisons — 4234 Emulation Differences

    The 4234 emulation will not support Load Symbol Sets (LSS)

    The 4234 emulation will use Courier for all Near Letter Quality (NLQ) mode printing, whereas 4234 NLQ mode was Gothic for 13.3, 16.7 and 18 CPI.

    The dot sizes are different. Also, the 6400 has a single dot size vs three with the 4234. For bar code applications, some combinations of unit module width, wide–to–narrow ratio, and element height may affect read rates.

    The 4234 emulation will support image and font resolution of 120 x 144 pel, compared to 144 x 144 pel in the 4234. This will cause images to change size in the vertical dimension.

- Proportional Space Mode (PSM) is not the same. Some differences will occur.

- IBM 6400 vs. 4234 IPDS Comparisons — Differences:

  The 6400 will report Loaded Font command set (LF2) in the Sense Type and Model (STM), but will not support Load Symbol Set (LSS).

  The 6400 will support Page Continuation Actions (PCA) without highlighting.

  The 6400 cannot detect Human Readable Information (HRI) outside of the Bar Code Presentation space under all circumstances.

- The Multi–Platform Interface Coax/Twinax feature of this printer is subject to the following limitations:

  You must select either coax or twinax attachment: only one can be active at one time. You can also use the Centronics Parallel interface for simultaneous attachment of a LAN or PC.

  Coax and twinax error detection and recovery is limited to those errors associated with the Centronics Parallel interface.

NOTE: For information on differences between this printer's data stream emulations and other printer data streams, such as the IBM Proprinter III XL, please refer to the *6400 ASCII Programmer's Reference Manual.*

D

Attaching Host Systems to a
Coax/Twinax Printer

Contents

Attaching Printer to an AS/400, MVS, or VM Host System

The following information describes how to attach this printer to an MVS host system or AS/400 Systems.

If you are installing this printer with the IPDS feature, review the *6400 IPDS Programmer's Reference Manual* for information on attaching a printer to host systems using IPDS.

If you are installing this printer with the Coax/Twinax Multi–Platform feature, review the *Coax/Twinax Multi–Platform Feature Installation and Operation Guide* for information on attaching the printer to a host system.

Attaching Printer to an AS/400 Host System

This chapter provides specific instructions on attaching the printer to your computer.

Supported host workstations include:

- Application System/400* and System/36
- 5294, 5394, and 5494 Remote Control Units

Attaching Printer to an AS/400 with Twinax Interface

⚠️ **DANGER:**

> **<4>** Do not connect or disconnect any communication port, teleport, attachment connector, or power cord during an electrical storm.
>
> **<5>** Power off the print and disconnect the power cord before connecting or disconnecting communication port, teleport, or attachment cable connector.

Follow these steps:

1. Select a printer address from 0 through 6.
2. From the printer operator panel Twinax Interface menu, make sure the printer address matches the printer address you selected from the table above. You can select addresses ranging from 0 through 6; the default address is 1.

3. If the IPDS feature is not installed, you must choose to emulate either a 5225 or 4234–2 printer from the Twinax Interface menu, under Printer Emulation. The default is 4234–2 printer emulation.

4. If the IPDS feature is installed, you must choose to emulate a 4234–12, from the IPDS menu, under IPDS Emulation Mode. The default is 4234–12 printer emulation. See the *IPDS Programmer's Reference Manual* for information on the IPDS Emulation Mode values.

5. Turn printer off.

6. Attach the twinax cable from your printer to your host workstation.

7. Turn the printer back on. AS/400's auto configuration program will query the printer and configure the host system software to recognize the printer.

8. You may want to execute the AS/400 Workstation Printer (VFYPRT) Verification Test to make sure the AS/400 host system recognizes the printer.

NOTE: If you do not want to use the system printer configuration that is created by AS/400's auto configuration program, you can change the printer configuration values as described below.

Changing Your AS/400 Printer Configuration

Your printer can be configured either as a 6400 printer or as a 4234–12 printer by setting 4234 Emulation Mode to **Yes** or **No**.

For more information on configuring a printer, see *AS/400 Device Configuration Guide* or the online configuration information on the system.

Changing Configuration with Auto Configuration

Auto Configuration can be utilized when either locally or remotely attaching to the system. The printer is configured as DEVTYPE (4234). Other parameters are automatically assigned by the system. See the *AS/400 Device Configuration Guide* for more information.

Changing Printer Configuration Settings on AS/400

If you want to change the settings created by AS/400's auto configuration, you will need to use the following parameters:

Parameter Description	Parameter	Parameter Setting
Device description	DEVD	Workstation printer name
Device class	DEVCLS	*LCL
Device type	TYPE	*IPDS (When printer is set to 4234–12 mode.)
Device type	TYPE	4234 (When printer is set to 4234–2 mode.)
Device model	MODEL	0000 (00 if IPDS (4234–12) and 02 if SCS (4234–2))
Advance Function	AFP	*NO (See Note)
Port number Printing	PORT	x
Switch setting	SWTSET	y (Printer station address)
Online at IPL	ONLINE	*YES
Attached controller	CTL	Twinaxial workstation controller name
Font identifier	FONT	zzz (Default font identifier)
Form feed	FORMFEED	* Cont

NOTE: AFP *Yes can be specified if the level of OS/400 supports the printer as an AFP printer and PSF/400 is installed.

Attaching Printer to Remote Control Unit with Twinax Interface

AS/400's auto configuration program does not support remote attached printers. You must manually configure this printer as a remote printer attached to a 5294, 5394, or 5494 Remote Control Unit. Use the following parameters when configuring this printer as a remote printer on AS/400:

Parameter Description	Parameter	Parameter Setting
Device description	DEVD	Workstation printer name
Device class	DEVCLS	*RMT
Device type	TYPE	*IPDS (When printer is set to 4234–12 mode.)
Device type	TYPE	4234 (When printer is set to 4234–2 mode.)
Device model	MODEL	0000 (00 if IPDS (4234–12) and 02 if SCS (4234–2))
Advanced Function	AFP	*NO (See Note)
Location Address	LOCADR	xx
Online at IPL	ONLINE	*YES
Attached controller	CTL	Remote controller name
Font identifier	FONT	yyy (Default font identifier)
Form feed	FORMFEED	* Cont

NOTE: AFP *Yes can be specified if the level of OS/400 supports the printer as an AFP printer and PSF/400 is installed.

Attaching Printer to an IBM System/36 with Twinax Interface

DANGER:

> **<4>** Do not connect or disconnect any communication port, teleport, attachment connector, or power cord during an electrical storm.
>
> **<5>** Power off the print and disconnect the power cord before connecting or disconnecting communication port, teleport, or attachment cable connector.

This section contains instructions for attaching your printer to an IBM System/36. For additional information not found here, see your System/36 documentation.

To connect your printer to a System/36, follow these steps:

1. From the printer operator panel, under Twinax menu, make sure the printer address matches the printer address you selected from the table above. You can select addresses ranging from 0 through 6; the default address is 1.

2. If the IPDS feature is not installed, you must choose to emulate either a 5225 or 4234–2 printer from the Twinax Interface menu, under Printer Emulation. The default is 4234–2 printer emulation.

3. If the IPDS feature is installed, you must choose to emulate a 4234–12 from the IPDS menu, under IPDS Emulation Mode. The default is 4234 printer emulation. See the *IPDS Programmer's Reference Manual* for information on the IPDS Emulation Mode values.

4. Turn off printer.

5. Attach the twinax cable from your printer to your host workstation.

6. Turn the printer back on. System/36's auto configuration program will query the printer and configure the host system software to recognize the printer.

NOTE: If you do not want to use the system printer configuration that is created by System/36's auto configuration program, you can change the printer configuration values as described below:

Attaching Printer to MVS Host S/370 and S/390 Systems

It is necessary to define a printer in the S/370–S/390 environment to VTAM*, JES2, POWER, PSF, VPS, JES328X Print Facility, NCP, VM, VSE, MVS, and/or other software depending upon your operating environment and printing requirements.

If you are attaching a printer with the IPDS feature installed, review the *6400 IPDS Programmer's Reference Manual* for information on configuring IPDS.

Types of Installation covered for MVS/JES2

Below is a list of configurations covered in this appendix:

- LU1–SCS–Local SNA 3174 Control Unit
- LU1–SCS–Remote SNA 3174 Control Unit

- LU3–DSE–Local SNA 3174 Control Unit
- LU3–DSE Remote SNA 3174 Control Unit
- LU0–DSC–Local Non–SNA 3174 Control Unit

6400–LU1–SCS–Local SNA 3174 Control Unit

LU1–SCS mode is utilized when *neither PSF support nor IPDS is required* to accomplish the print function desired. An existing local 3174 SNA–connected control unit is assumed. The steps required to install a local LU1–SCS printer for host definitions are as follows:

1. Define to VTAM by adding logmode entry to VTAM Logmode Table

2. Define to JES2 (Not required but recommended. See details below)

3. Define to CICS* or another Application Program such as VPS or JES328X products.

4. Select the options on the printer that are appropriate for the environment.

Step 1 – VTAM Definition

The following should be added to the Local Major Node VTAM definition. The printer will be attached as an LU1–IPDS capable printer.

LOC3174V BUILD TYPE=LOCAL

LOCPU74 PU   CUADDR=nnn...

LOC6400   LU

LOCADDR=n,MODETAB=MYMODETB,DLOGMODE=6400SCSL,ISTA
TUS=ACTIVE

The following entry should be placed in the VTAM MODE TABLE specified above or another of your choice.

6400SCSL MODEENT LOGMODE=6400SCSL,

        FMPROF=X'03',TSPROF=X'03',PRIPROT=X'B1',

        SECPROT=X'90',COMPROT=X'3080',RUSIZES=X'8787,

PSERVIC=X'01000000E100000000000000',

PSNDPAC=X'02',SRCVPAC=X'02',SSNDPAC=X'00'

Step 2 – JES2 Definition (SYS1.PARMLIB)

RMT1
LUTYPE1,BUFSIZE=3840,LINE=1,NUMRD=0,NUMPR=1,NOCOMP,NOCM
PCT,

SETUPHDR,CONSOLE

R1.PR1
CLASS=A,NOSEP,PRWIDTH=132,NOFCBLOD,WS=(W,R,Q,PMD,LIM,F,
T/C,P),

CKTPAGE=30

DESTID NAME=LOC6400,DEST=R1

Step 3 – Define to CICS or another application program

An application program must provide the SCS commands to control the printer. CICS, VPS, and other applications support SCS as well as numerous application programs, both customer written and vendor supplied. Refer to the vendor documentation for defining an SCS printer to the program for its use. If there is no specific information on the 6400 you may use the IBM 4234 for reference.

Step 4 – Printer Settings

It is recommended that the following printer settings be changed from factory default settings:

- Printer Control => Interface Selection => Coax
- Coax Interface => Format Control => Enable

6400–LU1–SCS–Remote SNA 3174 Control Unit

LU1–SCS mode is utilized when *neither IPDS nor PSF* is needed to accomplish the print function desired. An existing remote 3174 SNA–connected control unit is assumed. The steps required to install a remote LU1–SCS printer for host definitions are as follows:

1. Define to NCP, point to LU1 logmode entry defined below
2. Define to VTAM by adding logmode entry to VTAM Logmode Table
3. Define to JES2 (May not required if VPS. See details below)
4. Define to JES328X Print Facility, VPS, or equivalent product.
5. Select the options on the printer that are appropriate for the environment.

Step 1 – NCP Definition

    XYZ   GROUP   TYPE=NCP,...

    LINK   ADRESS=(032),...

    REMPU74 PU   ADDR=C1,...

    REM6400 LU   LOCADDR=#,(# replaced by port on control unit)

                       DLOGMOD=6400SCSR,(Default LOGMODE ENTRY NAME)

                       MODETAB=MYTABLE (Table name containing MODEENT)*

Step 2 – VTAM Definition

* The following entry should be placed in the VTAM MODE TABLE specified above or another of your choice.

6400SCSR MODEENT LOGMODE=6400SCSR,

            FMPROF=X'03',TSPROF=X'03',PRIPROT=X'B1',

            SECPROT=X'90',COMPROT=X'3080',RUSIZES=X'87C6',

            PSERVIC=X'01000000E100000000000000',

            PSNDPAC=X'01',SRCVPAC=X'01'

Step 3 – JES2 Definition

This definition is not required if you are using VPS and using U1 – U9999 as the printer ID.

RMT1
LUTYPE1,BUFSIZE=3840,LINE=1,NUMRD=0,NUMPR=1,NOCOMP,NOCMPCT,

SETUPHDR,CONSOLE (SETUPHDR=PDIR JES2 V3)

R1.PR1
CLASS=A,NOSEP,PRWIDTH=132,NOFCBLOD,WS=(W,R,Q,PMD,LIM,F,
T/C,P),

CKPTPAGE=30

DESTID NAME=P6400,DEST=R1

Step 4 – Define to CICS or another application program

An application program must provide the SCS commands to control the printer. CICS, VPS, and other applications support SCS as well as numerous application programs, both customer written and vendor supplied. Refer to the vendor documentation for defining an SCS printer to the program for its use. If there is no specific information on the 6400 you may use the IBM 4234 for reference.

Step 5 – Printer Settings

It is recommended that the following printer settings be changed from factory default settings:

- Printer Control => Interface Selection => Coax
- Coax Interface => Format Control => Enable

6400–LU3–DSE–Local SNA 3174 Control Unit

LU3–DSE mode is utilized when no host printing controls are required to accomplish the print function desired. The printer settings will be used and cannot be overridden by the host system. An existing local 3174 SNA–connected control unit is assumed. The steps required to install an LU1–DSE printer for host definitions are as follows:

1. Define to VTAM by adding logmode entry to VTAM Logmode Table
2. Define to JES2 (Not required but recommended. See details below)
3. Define to CICS or another Application Program such as VPS or JES328X products.
4. Select the options on the printer that are appropriate for the environment.

Step 1 – VTAM Definition

The following should be added to the Local Major Node VTAM definition.
The printer will be attached as an LU1–IPDS capable printer.

LOC3174   VBUILD   TYPE=LOCAL

LOCPU74 PU   CUADDR=nnn...

LOC6400   LU

LOCADDR=n,MODETAB=MYMODETB,DLOGMODE=printer,ISTATUS=ACTIVE

The following entry should be placed in the VTAM MODE TABLE specified
above or another of your choice.

6400DSEL MODEENTLOGMODE=6400DSEL,

          FMPROF=X'03',TSPROF=X'03',PRIPROT=X'B1',

          SECPROT=X'20',COMPROT=X'3080',RUSIZES=X'C7C7',

          PSERVIC=X'038000000000185018507F00'

          PSNDPAC=X'00',SRCVPAC=X'00',SSNDPAC=X'00'

Step 2 – JES2 Definition (SYS1.PARMLIB)

RMT1
LUTYPE3,BUFSIZE=3840,LINE=1,NUMRD=0,NUMPR=1,NOCOMP,NOCMPCT,

          SETUPHDR,CONSOLE

R1.PR1
CLASS=A,NOSEP,PRWIDTH=132,NOFCBLOD,WS=(W,R,Q,PMD,LIM,F,T/C,P),

          CKTPAGE=30

DESTID NAME=LOC6400,DEST=R1

Step 3 – Define to CICS or another application program

Refer to the vendor documentation for defining a DSE printer to the program
for its use. Host system commands to change printer settings are not
supported in DSE mode.

Step 4 – Printer Settings

It is recommended that the following printer settings be changed from factory default settings:

- Printer Control => Interface Selection => Coax
- Coax Interface => Format Control => Enable
- Coax Interface => Early Print Complete => Enable

In LU3 mode the printer settings control the orientation, CPI, LPI and all other aspects of the printed output. Therefore, you must set the printer settings to match the characteristics of the job you are printing. Host controls are not supported in this mode.

6400–LU3–DSE–Remote SNA 3174 Control Unit

LU1–DSE mode is utilized when host controls are not needed to accomplish the print function desired. An existing remote 3174 SNA–connected control unit is assumed. The steps required to install an LU1–DSE printer for host definitions are as follows:

1. Define to (NCP point to LU1 default logmode entry defined below)
2. Define to VTAM by adding logmode entry to VTAM Logmode Table
3. Define to JES2 (May not required if VPS. See details below)
4. Define to JES328X Print Facility, VPS, or equivalent product.
5. Select the options on the printer that are appropriate for the environment.

Step 1 – NCP Definition

XYZ	GROUP	TYPE=NCP,...
	LINK	ADRESS=(032),...
	PU	ADDR=C1,...
&luname	LU	LOCADDR=#, (# replaced by port on control unit)
		DLOGMOD=6400DSEL,(Default LOGMODE ENTRY NAME)
		MODETAB=MYTABLE (Table name containing MODEENT)*

Step 2 – VTAM Definition

* The following entry should be placed in the VTAM MODE TABLE specified above or another of your choice.

6400DSER MODEENTLOGMODE=6400DSER

        FMPROF=X'03',TSPROF=X'03',PRIPROT=X'B1',

        SECPROT=X'90',COMPROT=X'3080',RUSIZES=X'87C6',

        PSERVIC=X'038000000000185018507F00'.

        PSNDPAC=X'01',SRCVPAC=X'01'

Step 3 – JES2 Definition

This definition is not required if you are using VPS and using U1 – U9999 as the printer ID.

RMT1
LUTYPE3,BUFSIZE=3840,LINE=1,NUMRD=0,NUMPR=1,NOCOMP,NOCMPC ,

        SETUPHDR,CONSOLE (SETUPHDR=PDIR JES2 V3)

R1.PR1
CLASS=A,NOSEP,PRWIDTH=132,NOFCBLOD,WS=(W,R,Q,PMD,LIM,F,T/C,P),

        CKPTPAGE=30

DESTID NAME=P6400,DEST=R1

Step 4 – Define to CICS or another application program

Refer to the vendor documentation for defining a DSE printer to the program for its use. Host system commands to change printer settings are not supported in DSE mode.

Step 5 – Printer Settings

It is recommended that the following printer settings be changed from factory default settings:

- Printer Control => Interface Selection => Coax

- Coax Interface => Format Control => Enable
- Coax Interface => Early Print Complete => Enable

Since the host controls are not supported, the printer settings for CPI, LPI, and others should be set at the printer. See page Setup Guide.

6400–LU0–DSC–Local Non–SNA 3174 Control Unit

LU0–DSC mode is utilized when no host printing controls are required to accomplish the print function desired and the control unit is attached by a VTAM–Controlled NON–SNA Control Unit. An existing local 3174 NON–SNA–connected control unit is assumed. The steps required to install an LU0–DSC printer for host definitions are as follows:

1. Define to VTAM by adding logmode entry to VTAM Logmode Table
2. Define to JES2 (Not required but recommended. See details below)
3. Define to CICS or another Application Program such as VPS or JES328X products.
4. Select the options on the printer that are appropriate for the environment.

Step 1 – VTAM Definition

The following should be added to the Local Major Node VTAM definition. The printer will be attached as an LU1–IPDS capable printer.

LOC3174   VBUILD   TYPE=LOCAL

LOCPU74 PU   CUADDR=nnn...

LOC6400   LU

LOCADDR=n,MODETAB=MYMODETB,DLOGMODE=printer,ISTATUS=ACTIVE

The following entry should be placed in the VTAM MODE TABLE specified above or another of your choice.

6400DSCL MODEENTLOGMODE=6400DSCL,

            FMPROF=X'02',TSPROF=X'02',PRIPROT=X'60',

            SECPROT=X'40',COMPROT=X'0000',RUSIZES=X'C7C7',

PSERVIC=X'00000000000185018507F00'

PSNDPAC=X'80',SRCVPAC=X'00',SSNDPAC=X'00'

Step 2 – JES2 Definition (SYS1.PARMLIB)

RMT1
LUTYPE0,BUFSIZE=3840,LINE=1,NUMRD=0,NUMPR=1,NOCOMP,NOCM
PCT,

SETUPHDR,CONSOLE

R1.PR1
CLASS=A,NOSEP,PRWIDTH=132,NOFCBLOD,WS=(W,R,Q,PMD,LIM,F,
T/C,P),

CKTPAGE=30

DESTID NAME=LOC6400,DEST=R1

Step 3 – Define to CICS or another application program

Host commands for changing printer settings are not supported in this mode. Refer to the vendor documentation for defining an DSC printer to the program for its use.

Step 4 – Printer Settings

It is recommended that the following printer settings be changed from factory default setting:

- Printer Control => Interface Selection => Coax
- Coax Interface => Format Control => Enable
- Coax Interface => Early Print Complete => Enable

In LU0 mode the printer settings control the orientation, CPI, LPI and all other aspects of the printed output. Therefore, you must set the printer settings to match the characteristics of the job you are printing. Host controls are not supported in this mode.

Attaching Printer to VM Host System

Below are sample execs you can read in order to help you to understand how to attach this printer to a VM host system:

SNA Attachment

Sample exec file for attaching with SNA protocols:

```
/* Signal JUST_VM */
 'CP SMSG VTAMOPX F
NET,DEFAULTS,ID=LS6C004,DLOGMOD=LU1PRT'
 /* 'CP SMSG VTAMOPX F
NET,DEFAULTS,ID=LS6C004,DLOGMOD=LU3PRT' */
 pull upper pause
'SMSG RSCSCOAX STOP SNA6C004'
'SMSG RSCSCOAX DELET SNA6C004'
'SMSG RSCSCOAX DEFINE SNA6C004 LUNAME LS6C004 TYPE
SNA3270P'
/* 'SMSG RSCSCOAX DEFINE SNA6C004 PARM VFC=YES SEP=YES
TR=ASISCC' */
'SMSG RSCSCOAX DEFINE SNA6C004 PARM VFC=YES SEP=NO
TR=ASISCC'
/* 'SMSG RSCSCOAX DEFINE SNA6C004 PARM VFC=YES SEP=NO'
*/
'SMSG RSCSCOAX START SNA6C004 CLASS * QUEUE FIFO FORM
*'
JUST_VM:
'CP SPOOL PRINT TO RSCSCOAX'
'CP TAG DEV PRT TO SNA6C004 SYSTEM 1'
'CP TA DE PRT SNA6C004 SYSTEM 1'
```

Non–SNA Attachment

Sample exec file for attaching to a LOCAL 3174 NON SNA port

```
/* Signal JUST_VM    to avoid redefining printer */
'DISABLE XXXX'
'ATT 1601 TO RSCSCOAX AS XXXX'
'SMSG RSCSCOAX STOP PRTXXXX'
'SMSG RSCSCOAX DELET PRTXXXX'
'SMSG RSCSCOAX DEFINE PRTXXXX LINE XXXX TYPE 3270P PARM
BUF=2560'
Use as approriate:
/* 'SMSG RSCSCOAX DEFINE PRTXXXX LINE 1601 TYPE 3270P PARM
COMP=NO' */
/* 'SMSG RSCSCOAX DEFINE PRTXXXX PARM VFC=YES SEP=YES' */
/* 'SMSG RSCSCOAX DEFINE PRTXXXX PARM VFC=YES SEP=NO' */
/* 'SMSG RSCSCOAX DEFINE PRTXXXX PARM VFC=NO SEP=NO
TR=ASISCC' */
/* 'SMSG RSCSCOAX DEFINE PRTXXXX PARM VFC=NO SEP=NO
TR=TEXT FEAT=AT' */
/* 'SMSG RSCSCOAX DEFINE PRTXXXX PARM VFC=NO SEP=NO ' */
'SMSG RSCSCOAX DEFINE PRTXXXX PARM VFC=NO SEP=NO'
'SMSG RSCSCOAX START PRTXXXX CLASS * QUEUE FIFO FORM *'
JUST_VM:
'CP SPOOL PRINT TO RSCSCOAX'
'CP TAG DEV PRT TO PRTXXXX SYSTEM 1'
'CP TA DE PRT PRTXXXX SYSTEM 1'
```

Physical and Logical Unit Types

This section describes some of the Physical Unit (PU) types and Logical Unit (LU) types that you are likely to use when configuring this printer on your host system. Generally, the PU defines the type of communications relationship that the HOST VTAM has with a communications controller such as a 3174 control unit or a controller inside a printer such as a 3820 or 3935. Alternatively, it can describe the relationship that one host VTAM has to another host VTAM or equivalent, such as an AS/400.

Physical Unit (PU) types and examples

Physical Units, as implied, are part of the physical hardware such as a control unit (3174). VTAM and NCP use various PU types in conjunction with the Logical Unit (LU) types to define the device and logical session to be established with an SNA network.

PU type 2

The PU type 2 is the physical unit type that is required for an LU type 0, type 1, or type 3 (see LU type description following). Examples of PU type 2 are 3174 control units.

PU type 2.1

The PU type 2.1 is the physical unit type that is required for an LU 6.2 (see LU type description following). Examples of PU type 2.1 is an IBM 3820, IBM 3935, or PSF/2.

Summary of LU Types and Representative IBM Products

Listed below are the LU types that SNA currently defines and the kind of configuration or application that each type represents. Also mentioned are hardware or software products that typically use each type of logical unit. A logical unit (LU) describes the type of relationship that the Host VTAM and applications have with a specific device such as a printer. This relationship determines the commands supported from the host to the device and the type of feedback the device gives to the host.

LU type 0

LU type 0 printers are Non–SNA Local or Bisync connections. This mode is also commonly called DSC (Data Stream Compatibility) mode printing. An example of an LU 0 printer connection is an IBM 3816 attached to a non–SNA 3174 control unit. Not all printers support this type connection. This connection type is used when VTAM is controlling the non–SNA control unit and device.

LU type 1

An LU type 1 is for an application program that communicates with single or multiple–device data processing workstations in an interactive, batch data transfer, or distributed data processing environment. The data stream conforms to the SNA Character String (SCS) or Document Content Architecture (DCA). Examples of printers that are able to communicate via LU1 are 4230, 4234, 3930, 6400 and others.

LU type 1 is the basic logical unit type for SCS, IPDS, and AFPDS (PSF) printing. The type of connection is determined by the application that will be driving the printer. The selection is made by changes in the VTAM logmode entry that is used for the logical unit. See the examples for the type of connection desired.

LU type 2

LU type 2 is use by an application program that communicates with a single display workstation in an interactive environment, using the SNA 3270 data stream. Type 2 LU's also use the SNA 3270 data stream for file transfer. An example of an LU type 2 device is a 3270 display such as a 3278, 3178, and others.

LU type 3

An LU type 3 is for an application program that communicates with a single printer using the SNA 3270 data stream. Another name for this connection is Data Stream Extended (DSE). This type of connection will not support the SCS data stream and may be used when no host controls are to be sent to the printer. An example of printers that may use this method of connection are 4230, 3912, 6400, 3930, and others.

LU type 4

LU type 4 is is seldom used today. It is used for (1) an application program that communicates with a single or multiple–device data processing or work

processing workstation in an interactive, batch data transfer, or distributed data processing environment (for example, an LU for an application program that uses CICS/VS and communicates with an IBM 6670 Information Distributor); or (2) logical units in peripheral nodes (for example, two 6670's) that communicate with each other. The data stream is the SNA Character String (SCS) for data processing environments and Office Information Interchange (OII) Level 2 (a precursor of DCA) for word processing environments.

LU type 6.1

An LU type 6.1 is for an application subsystem that communicates with another application subsystem in a distributed data processing environment. An example of an LU type 6.1 is an application program that uses CICS/VS and communicates with an application program that uses IMS/VS.

LU type 6.2

An LU type 6.2 supports sessions between two applications in a distributed data processing environment. The data stream is either the SNA General Data Stream (GDS), which is a structure–field data stream, or a user–defined data stream. LU 6.2 session provide communication between (1) two PU type 5 nodes (host resource–owning VTAM), (2) a PU type 5 node and a PU type 2.1 node, and (3) two PU type 2.1 nodes. Examples (1) VTAM–to–VTAM communication, or an application program that uses CICS/VS and communicates with another application program that uses CICS/VS, (2) An application program which uses VTAM and PSF/MVS communicating with an IBM 3820, 3935, or PSF/2; or (3) Two AS/400's communicating in APPC mode.

LU type 7

An LU type 7 is for an application program and a single display workstation in an interactive environment. An example of an LU type 7 is an application program in an AS/400 communicating with a 5250–type terminal. The data stream is the 5250 data stream.

E Code V, IGP, and IPDS Menus

Contents

Code V, IGP, and IPDS Menus for Optional Features

If you have installed these features, the following menus can be accessed from the operator panel. These menus appear only if the feature is installed. The following sections are brief descriptions of the menu selections for each feature and are provided here as a quick reference to these feature menus.

For detailed information on these menu selections, refer to the documentation that was shipped with the feature.

Code V and IGP with twinax require that the IBM Twinax emulation be set to 4234–2 or 5225.

Code V Feature (VGL)

Configuration

Matching printer operational settings to those of the host computer is known as printer configuration. The settings, or configuration parameters, such as selecting the host interface, are adjusted according to the configuration instructions in Chapter 3, "Configuring the Printer." Configure the Code V feature in the same way you would configure the printer for other features.

You can select Code V parameters directly from the operator panel as explained in this chapter, or by control codes as explained in the *6400 Code V User's Manual.*

Code V Parameters

The Code V parameters are described on the following pages. Parameters marked with an asterisk (*) indicate the default value. The printer must be off–line to enter the configuration structure.

Enter and exit the Code V configuration menu according to the steps outlined in Chapter 3, "Configuring the Printer." Pressing an invalid key to enter a parameter value may move you to another level in the configuration or exit the configuration menu completely.

IMPORTANT

BEFORE you reconfigure the Code V, print a configuration sheet to see all of the current settings. Refer to Chapter 3, "Configuring the Printer."

Configure the Code V according to your specific requirements.

The Code V configuration menu is shown in Figure E–1 on the following page.

Code V Configuration Menu
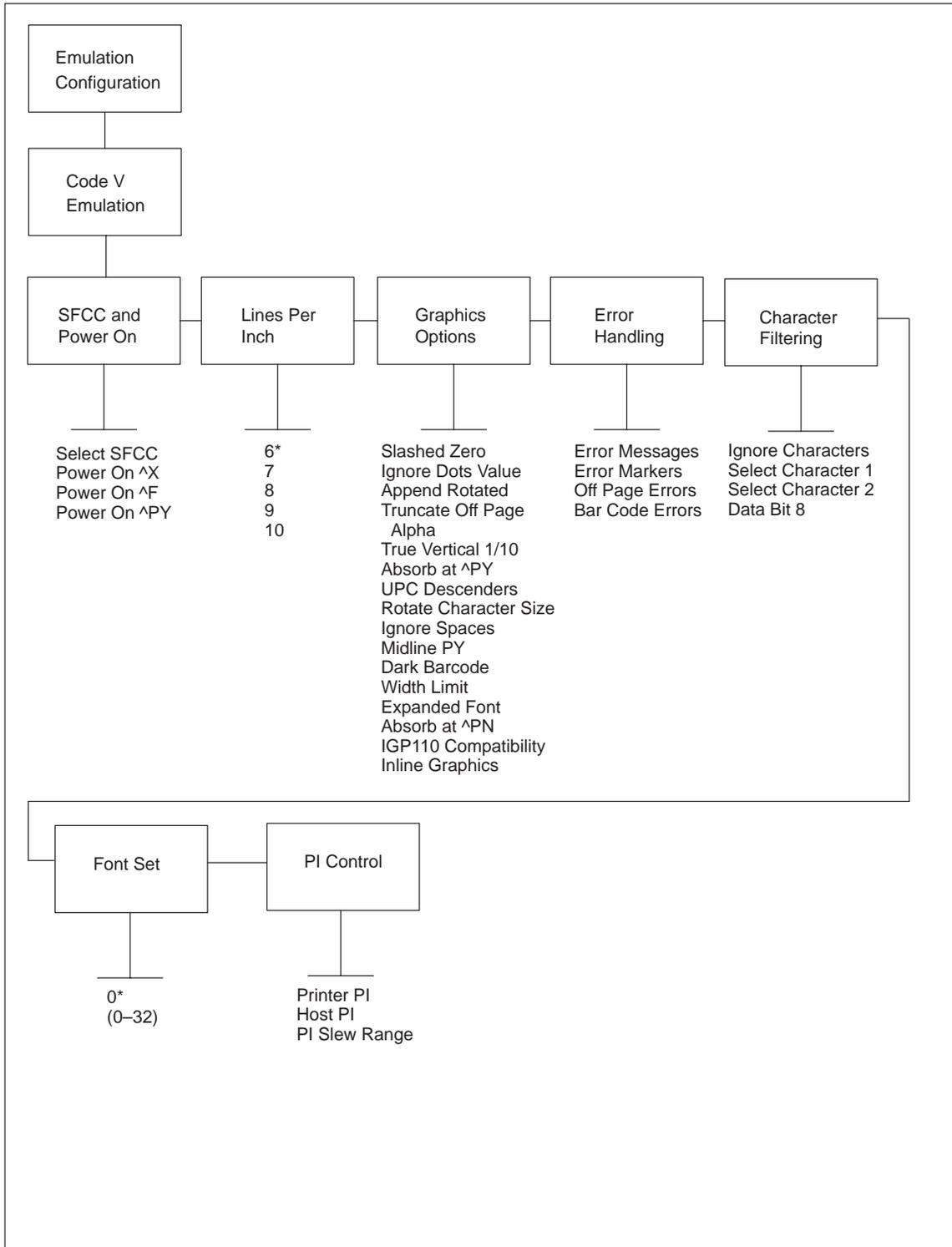
Figure E–1. Code V Configuration Menu

Select SFCC

Selects the Special Function Control Character. Valid values are 11 (hex) through FF (hex). The default value is 5E (hex). Always use the SFCC required for your configuration wherever the circumflex, or (cc) is shown. Obtain a configuration printout to determine the currently selected SFCC.

Power On ^X

Selects the ignore mode power up condition. Refer to the *6400 Code V User's Manual* for more information.

- **Disable**. The default. Does not select the ignore mode as the power–up default.
- **Enable**. Selects the ignore mode as the power–up default, and selects the graphics mode (cc)PY as the power–up default. All characters are ignored until a (cc)A command is received.

Power On ^F

Enable Free format causes the Code V to ignore carriage returns, line feeds and all characters below 20 hex sent from the host. Refer to the *6400 Code V User's Manual* for more information on Free Format.

- **Disable**. The default. Does not select free format as the power–up default.
- **Enable**. Selects free format as the power–up default, and selects the graphics mode (cc)PY as the power–up default.

Power On ^PY

Selects the graphics mode power up condition. Refer to the *6400 Code V User's Manual* for more information.

- **Disable**. The default. Does not select the graphics mode (cc)PY as the power–up default.
- **Enable**. Selects the graphics mode (cc)PY as the power–up default.

Lines Per Inch

Defines the number of lines per inch for the Code V to use. Can also be set by using the ^@L command. The following number of lines per inch may be selected:

- **6** The default.
- **7**
- **8**
- **9**
- **10**

Graphics Option

Slashed Zero

- **Disable**. The default. Prints zeros without a slash (0).
- **Enable**. Prints zeros with a slash (Ø) to distinguish zeros from the alphabetical capital "O."

Ignore Dots Value

- **Disable**. The default.
- **Enable**. Causes the Code V to expect position values to be specified in only 1/10 of an inch. If the dot position is also given, it is treated as text.

Append Rotated

- **Disable**. The default. Appends logos to an alphanumeric string rotated in a clockwise, counterclockwise, or inverted orientation.
- **Enable**. When enabled, the logo is treated as a separate element.

Truncate Off Page Alpha

When enabled, this parameter prevents the printing of Error 48 (Element Off Page Error) if alphanumeric data, including spaces, extends beyond the right side of the form.

- **Disable**
- **Enable**

True Vertical 1/10

Determines if a vertical 1/10 of an inch parameter is used as 1/10 of an inch (Enabled) or as 7/72 of an inch (Disabled). When used as 1/10 of an inch, rounding will occur to the nearest 1/72 of an inch. This can cause vertical moves that have the same value to differ by $\pm 1/72$ of an inch. When used as 7/72 of an inch, the absolute move is slightly smaller than expected. For example, a one inch move would be 70/72 of an inch. Vertical moves that have the same value will be identical in length.

- **Disable**. The default.
- **Enable**

Absorb at ^PY

- **Absorb Motion.** The default. Prevents paper motion following a system terminator in a graphics (cc)PY command.
- **Disable**. When disabled, system terminators following a graphics command are sent to the printer and result in paper motion.

- **Absorb All.** When absorb all is selected, the system ignores all the data and terminator until a host generated terminator is detected.

UPC Descenders

This parameter determines if a gap is left for human readable data in UPC/EAN bar codes, even if there is no human readable data. There will be no change if there is human readable data.

- **Enable**. The default. Leaves a gap even if there is no human readable data.
- **Disable**. Does not leave a gap if there is no human readable data.

Rotate Character Size

The Rotated Character Size option determines if rotated (clockwise/counter–clockwise), expanded characters have a different size than a non–rotated character with the same size parameters (Adjusted) or the same size (Not Adjusted).

- **Adjusted**. The default.
- **Not Adjusted**

Ignore Spaces

- **Disable**. The default. Trailing spaces are NOT deleted from alphanumeric elements in a graphics pass.
- **Enable**. Trailing spaces are deleted from alphanumeric elements in a graphics pass.

Midline PY

- **Enable**. Allows printable characters to precede the ^PY command.
- **Disable**. The default. Requires the ^PY command to be the first characters on a line.

Dark Barcode

- **Disable.** The default. Bar codes are printed in normal mode.
- **Enable.** When enabled, prints all bar codes in a dark mode.

Expanded Font

- **Scalable:** The default. These expanded characters have rounded edges.
- **Block:** These are block characters compatible with the IGP–X00 printers.

Width Limit

- **Disable.** The default. This does not limit the width of expanded characters.
- **Enable.** When enabled, limits the width of expanded characters based on a fixed maximum ratio of width over height.

Absorb at ^PN

- **Disable**. The default. When disabled, system terminators following the (cc)PN command are sent to the printer and result in paper motion.
- **Enable**. Prevents paper motion following the (cc)PN command.

IGP110 Compatibility

- **Enable.** The Default. This menu will process ^IPEXP commands in the same manner the IGP does, and does not expand special font characters if an ^IPEXP command precedes it.

- **Disable.** If disabled, it will allow the special font characters to be expanded.

Inline Graphics

- **Enable.** Permits Code V graphics to start in the middle of a print line as opposed to moving to the beginning of the line to start a graphic.
- **Disable.** The default. Requires the printer move to the beginning of the line to start a graphic.

Error Handling

Error Messages

- **Disable**. Suppresses error checking and error messages.
- **Enable**. The default. Checks command syntax and prints error messages when command parameters are incorrect.

Error Markers

- **Enable**. The default. Prints the following error markers for those elements that print beyond the page boundaries:

  >> for elements that begin off the right side
  of the page;

  << for elements that begin at the indicated position
  but end off the page;

  ❚ for elements where the starting position of the
  command contains an error other than an off–page error.

- **Disable**. Does not print error markers for those elements that print beyond the page boundaries.

Off Page Errors

- **Disable**. The default. Does not report errors for elements that start or end beyond the right edge of the page.
- **Enable**. Reports errors for elements that start or end beyond the right edge of the page.

Bar Code Errors

- **Enable**. The default. Prints an error message when invalid bar code data is encountered.

- **Disable**. Does not print an error for invalid bar code data and the bar code will be printed as is.

Character Filtering

Ignore Characters

Determines if character filtering is enabled, or if one or both characters are ignored.

- **Disable**. The default. Does not ignore the characters selected with the select character options.
- **Character 1**. The character selected using the Select Character 1 option will be ignored in the data string.
- **Character 2**. The character selected using the Select Character 2 option will be ignored in the data string.
- **Character 1 and 2**. Both characters selected using the Select Character 1 and Select Character 2 options will be ignored in the data string.

Select Character 1

Selects character 1 for the character filtering option. Valid values are from 0 through 255 (decimal). The default value is 0.

Select Character 2

Selects character 2 for the character filtering option. Valid values are from 0 through 255 (decimal). The default value is 0.

Data Bit 8

- **Enable.** The default. The PI line is not passed directly from host to printer; all 8 bits are used for data bits, and characters in the 80–FF hex range can be accessed.

- **Disable**. When the host PI line is enabled, indicates PI line status. To use the PI line, disable data bit 8, and enable the Host PI configuration option.

NOTE: Data bit 8 is interpreted as *either* data bit 8 or PI signal, but never both. When enabled as data bit 8, data bit 8 has priority over the PI signal, and all data above 7F hex is used to access character data and not to interpret PI line data.

Conversely, when data bit 8 is disabled and the PI signal is used, data bit 8 of the data is reserved for use as the PI function, and you cannot access characters in the 80–FF hex range. Therefore, to access characters in the 80–FF hex range, data bit 8 *must* be enabled.

Font Set

This parameter allows you to select a font for the Code V feature. The default is 0, which is U.S. ASCII. Valid selections are 0 to 32. The following predefined values are available:

0	U.S. ASCII
1	German
2	Swedish
3	Danish
4	Norwegian
5	Finnish
6	English
7	Dutch
8	French
9	Spanish
10	Italian
11	Turkish
12	0858 PC Euro Multilingual
13	0923 Latin 9 8859–15

PI Control

Printer PI

- **Disable**. The default. Does not inform the Code V that the ASCII emulation is configured with the PI line enabled.

- **Enable**. Informs the Code V that the ASCII emulation is configured with the PI line enabled.

Host PI

- **Disable**. The default. The Data Bit 8 configuration option must be disabled to transmit the PI line to the printer.

- **Enable**. Informs the Code V that the host sends PI signals.

PI Slew Range

This parameter determines if the range for a paper slew is from 1 through 15 lines or 1 through 16 lines.

- **Enable.** The default. A paper slew of 0–15 will move 1–16 lines.

- **Disable.** A paper slew of 1–15 will move 1–15 lines. A paper slew of 0 will move 1 line.

IGP Feature (PGL)

Configuration

Matching printer operational settings to those of the host computer is known as "printer configuration." The settings, or configuration parameters, such as selecting the host interface, are adjusted according to the operator panel key descriptions in your *Operator's Guide*. Configure the IGP feature in the same way you would configure the printer for other features.

You can select IGP default parameters directly from the operator panel as explained in this chapter, or by control codes as explained in the *6400 IGP User's Manual*.

IGP Parameters

The IGP parameters are described on page E–15 and the following pages. Parameters marked with an asterisk (*) indicate the default value. The printer must be off–line to enter the configuration structure.

Enter and exit the IGP configuration menu according to the configuration procedures in Chapter 3, "Configuring the Printer." Pressing an invalid key to enter a parameter value may move you to another level in the configuration or exit the configuration menu completely.

IMPORTANT

BEFORE you reconfigure the IGP, print a configuration sheet to see all of the current settings. Refer to Chapter 3, "Configuring the Printer."

Configure the IGP according to your specific requirements.

The IGP configuration menu is shown in Figure E–2 on the following page.

IGP Configuration Menu

```
┌─────────────────┐
│ Emulation       │
│ Configuration   │
└─────────────────┘
        │
┌─────────────────┐
│ IGP             │
│ Emulation       │
└─────────────────┘
        │
┌───────────┐  ┌───────────┐  ┌───────────┐  ┌───────────┐  ┌───────────┐  ┌───────────┐
│ Define CR │  │ Define LF │  │ Auto LF   │  │ Select    │  │ PI Slew   │  │ CR        │
│ Code      │  │ Code      │  │           │  │ SFCC      │  │ Range     │  │ Edit      │
└───────────┘  └───────────┘  └───────────┘  └───────────┘  └───────────┘  └───────────┘
      │              │              │              │              │              │
 CR  =  CR*      LF = LF*       Disable*        1–FF           15          Disable*
 CR = CR + LF    LF = CR + LF   Enable          7E*            16*         Enable

┌───────────┐  ┌───────────┐  ┌───────────┐  ┌───────────┐  ┌─────────────┐  ┌───────────┐
│ Select    │  │ Slash Ø   │  │ Lines Per │  │ Mono/Dual │  │ Skip Command│  │ Power On  │
│ Font      │  │           │  │ Inch      │  │ Case      │  │ Prefix      │  │ IGP       │
└───────────┘  └───────────┘  └───────────┘  └───────────┘  └─────────────┘  └───────────┘
      │              │              │              │              │              │
  0–33,          Enable      6 Lines Per Inch*  Dual Case*     Enable*        Enable*
  0*             Disable*    8 Lines Per Inch   Mono Case      Disable        Disable
                             9 Lines Per Inch
                            10 Lines Per Inch

┌───────────┐  ┌───────────┐  ┌───────────┐  ┌───────────┐  ┌─────────────┐  ┌───────────┐
│ Ext       │  │ UPC       │  │ Compressed│  │ Ignore    │  │ IGP100      │  │ Expanded  │
│Execute Copy│ │ Descenders│  │ CPI       │  │ Character │  │ Compatibility│ │ Font      │
└───────────┘  └───────────┘  └───────────┘  └───────────┘  └─────────────┘  └───────────┘
      │              │              │              │              │              │
  Disable*       Disable       Disable*      Ignore Mode      Disable        Scalable
  Enable         Enable*       Enable         Disable*        Enable*        Block*
                                              Enable                         Alt Block 1
                                             Select Character
                                              0–255
                                              0*

┌───────────┐
│ Optimized │
│ Ratio     │
└───────────┘
      │
  Disable*
  Enable
```

Figure E–2. IGP Configuration Menu

Define CR Code (Carriage Return)

This parameter forces the printer to insert an automatic Line Feed code into the data stream whenever a Carriage Return code occurs. This is to be used only if the host computer does not send Line Feeds to the printer.

- **CR = CR**. The default. Does NOT perform a line feed. The next print position will be print position 1 of the current line.
- **CR = CR + LF**. Performs an automatic line feed. The next print position will be print position 1 of the next line.

Define LF Code (Line Feed)

This parameter forces the printer to insert an automatic Carriage Return code into the data stream whenever a Line Feed code occurs. This can be used in most installations, but it is required if the host computer does not send Carriage Returns to the printer.

- **LF = LF**. The default. Does not perform an automatic carriage return. The next print position will be the current print position of the next line.
- **LF = CR + LF**. Performs an automatic carriage return. The next print position will be print position 1 of the next line.

Auto LF

This parameter determines if text will wrap to the next line when the line of text exceeds the right margin.

- **Disable**. The default. Truncates the text beyond the right margin until a CR or CR + LF is received.
- **Enable**. Automatically inserts a CR + LF after a full print line.

Select SFCC

You can specify which hex code (1–FF) will be used as the Special Function Control Character (SFCC). The factory default setting is 7E. The SFCC denotes that the following data is an IGP command.

PI Slew Range

You can specify how many lines the paper will feed.

- **15**. A paper slew of 1–15 will move 1–15 lines. A paper slew of 0 will move 1 line.
- **16**. The default. A paper slew of 0–15 will move 1–16 lines.

CR Edit

This parameter determines if a carriage return will be followed by a line feed.

- **Disable**. The default. The printer ignores all carriage returns that are not followed by line feeds.
- **Enable**. The printer processes all carriage returns, even for those that are not followed by line feeds.

Select Font

This parameter allows you to select a font for the IGP feature. The default is 0, which is U.S. ASCII. Valid selections are 0 to 33. The following predefined values are available:

0	U.S. ASCII
1	German
2	Swedish
3	Danish
4	Norwegian
5	Finnish
6	English
7	Dutch
8	French
9	Spanish
10	Italian
11	Turkish
12	0858 PC Euro Multilingual
13	0923 Latin 9 8859–15

Values 14–23 are undefined and will default to 0. You can set values 24–31 to specific fonts; refer to the USET command.

Slash Ø

This option allows you to select is zeros will print with or without a slash (Ø).

- **Disable**. The default. Prints zeros without a slash (0).
- **Enable**. Prints zeros with a slash (Ø) to distinguish zeros from the alphabetical capital "O."

Lines Per Inch

This is the number of lines to be printed per inch. For example, at 6 lpi there is 1/6–inch from the top of one print line to the top of the next print line. The following number of lines per inch may be selected:

- **6** The default.
- **8**
- **9**
- **10**

Mono/Dual Case

This parameter enables the printer to print text in all uppercase when using the ALPHA command.

- **Dual Case**. The default. The printer will print text in upper– and lowercase.
- **Mono Case**. The printer will print text in uppercase only.

Skip Command Prefix

This parameter determines if a data string before an IGP command will be ignored.

- **Disable**. The printer will print any data before an IGP command.
- **Enable**. The default. The printer ignores all text before an IGP command.

Power On IGP

You can set the IGP feature so that it is enabled or disabled when the printer is powered on.

- **Disable**. The IGP is disabled when the printer is powered on. (The IGP feature is initialized to the Quiet mode.)
- **Enable**. The default. The IGP is enabled when the printer is powered on. (The IGP feature is initialized in the Normal mode.)

Extended Execute Copy

- **Disable**. The default. Dynamic data, overlay data, etc. are not allowed if the optional Form Count parameter (number of forms to print) is specified as part of the Execute command. (This setting is IGP–100/200/400 compatible.)
- **Enable**. Dynamic data, overlay data, etc. are allowed within a form in which the Form Count parameter is specified in the Execute command. In this case, the exact same form (with identical dynamic data, etc.) is printed for whatever the Form Count is. However, incremental data is *not* incremented since the page that is printing is exactly the same. Also, each form is printed on a separate page.

UPC Descenders

This parameter determines if a gap is left for human readable data in UPC/EAN bar codes, even if there is no human readable data. There will be no change if there is human readable data.

- **Disable**. The IGP does not leave a gap if there is no human readable data.
- **Enable**. The default. The IGP leaves a gap, even if there is no human readable data.

Compressed CPI

This parameter allows you to choose a compressed character for CPI instead of the normal height character.

- **Disable**. The default. The IGP does not use the compressed CPI font.
- **Enable**. The IGP uses the compressed CPI font.

Ignore Character

Ignore Mode

This parameter instructs the IGP to ignore the character selected under the Select Character menu.

- **Disable**. The default. The IGP does not ignore any characters.
- **Enable**. The IGP ignores the characters selected under the Selected Character menu.

Select Character

This instructs the IGP which character to ignore from the host. Valid selections are from 0–255. The default is 0.

IGP100 Compatibility

This option instructs the IGP to behave similarly to the 100 version of the IGP with respect to certain commands.

All new users with new applications should select the "Disable" option. Selecting this mode insures the printer will behave as described in this manual. The other version is required to emulate the behavior of IGP100 printers that may be inconsistent with the documented PGL functionality.

When replacing an older product operating with an existing application, especially those using the PMODE and SMODE commands, the IGP100 mode may need to be selected.

- **Disable**. The IGP does not emulate the IGP–100 mode.
- **Enable**. The default. The IGP emulates the IGP–100 version.

Expanded Font

This option defines the type of expanded character the IGP/PGL will select. The following choices are:

- **Scalable:** These expanded characters have rounded edges.
- **Block:** The default. These are block characters compatible with the IGP–X00 printers.
- **Alt Block 1:** This is a customized block character set that is only available for the non–overlay multinational group of character sets.

Optimized Ratio

This option selects different bar code ratios for certain bar codes including Code 39 and interleaved 2 of 5. It is included for compatibility with IGP–X00 printers.

- **Disable**. The default. Use standard bar code ratios.
- **Enable**. Select the alternate bar code ratios.

IPDS Feature

Configuration

Matching printer operational settings to those of the host computer is known as "printer configuration." The settings, or configuration parameters, such as selecting the host interface, are adjusted according to the operator panel key descriptions in your *Operator's Guide*. Configure the IPDS in the same way you would configure the printer for other features.

You can select IPDS default parameters directly from the operator panel as explained in this chapter, or by application commands as explained in the *6400 IPDS Programmer's Reference Manual.*

NOTE: The IPDS feature is not available with the Multi–Platform Interface Coax/Twinax feature.

IPDS Parameters

The IPDS parameters are described on page E–23 and the following pages. Parameters marked with an asterisk (*) indicate the default value. The printer must be off–line to enter the configuration structure.

Enter and exit the IPDS configuration menu according to the configuration procedures in Chapter 3, "Configuring the Printer." Pressing an invalid key to enter a parameter value may move you to another level in the configuration or exit the configuration menu completely.

IMPORTANT

BEFORE you reconfigure the IPDS, print a configuration sheet to see all of the current settings. Refer to Chapter 3, "Configuring the Printer."

Configure the IPDS according to your specific requirements.

The IPDS configuration menu is shown in Figure E–3 on the following page.

IPDS Configuration Menu

```
┌──────────────┐
│ NOT READY    │
└──────┬───────┘
       │
   ┌───┴──────┐                    ┌──────────┐
   │ Twinax   │────────────────────│ Coax     │──────────────┐
   │ Interface│                    │ Interface│              │
   └───┬──────┘                    └───┬──────┘              │
       │                               │                     │
   ┌───┴────┐   ┌──────────┐    ┌──────┴───┐   ┌──────────┐  │
   │ Early  │   │ Undefined│    │ Early    │   │ Undefined│  │
   │ Print  │───│ Character│    │ Print    │───│ Character│  │
   │Complete│   │Substitut.│    │ Complete │   │Substitut.│  │
   └───┬────┘   └────┬─────┘    └────┬─────┘   └────┬─────┘  │
       │             │               │              │        │
   Disable*         60*           Disable*         60*       │
   Enable           40 – FE       Enable           40 – FE   │
                                                             │
   ┌──────────────┐                                          │
   │ Emulation    │◄─────────────────────────────────────────┘
   │ Configuration│
   └──────┬───────┘
          │
      ┌───┴──┐
      │ IPDS │
      └───┬──┘
          │
   ┌──────┴─┐  ┌────────┐  ┌────────┐  ┌────────┐  ┌──────────┐
   │Override│  │Graphics│  │Bar Code│  │ Image  │  │ IPDS     │
   │ Host   │  │Quality │  │Quality │  │Quality │  │Emulation │─┐
   └───┬────┘  └───┬────┘  └───┬────┘  └───┬────┘  │ Mode     │ │
       │           │           │           │       └────┬─────┘ │
   Disable*     High        High*        Low*        4234*      │
   Enable       Medium*     Low          High        6408/6412  │
                Low                                              │
   ┌─────────┐  ┌────────┐  ┌─────────┐  ┌──────────┐           │
   │ Postnet │  │UPC/EAN │  │Enhanced │  │Compressed│◄──────────┘
   │ Barcode │  │Barcode │  │Barcode  │  │ Font     │
   │ Width   │  │ HRI    │  │ Mode    │  │          │
   └───┬─────┘  └───┬────┘  └───┬─────┘  └────┬─────┘
       │            │           │             │
   Standard*     On*        Disable*       Disable*
   Narrow        Data Stream Enable         Enable
                 Setting
```

Figure E–3. IPDS Configuration Menu

Early Print Complete (Twinax IPDS)

Early Print Complete is accessed under the Twinax Interface menu selection. This configuration value applies only to IPDS on Twinax. Early Print Complete is used to determine when the next print job can be sent to the printer. Do not enable or disable Early Print Complete while a print job is in process. If you do, you will need to restart the printer.

- **Disable**. The default. The printer waits for the system or controller to finish a job before issuing a print complete status. The spool file is not released until printing is completed. This can cause the printer to print at less than rated speed but can help ensure that all data is printed.

- **Enable**. The printer does not wait for the system or controller to finish a job before issuing a print complete status. The spool file can be deleted before printing is completed. This can cause the printer to print at rated speed, especially when many short are sent to the printer at the same time.

NOTE: Some data, particularly the last few lines of the last print job, may be lost when this setting is enabled.

Undefined Character Substitution (Twinax IPDS)

Undefined Character Substitution is accessed under the Twinax Interface menu selection. This configuration value applies only to IPDS on Twinax. Undefined Character Substitution specifies the replacement character to print in place of any unprintable character that is received by the host.

The character code point can range from hex 40 to hex FE. The factory default is set to hex 60.

Early Print Complete (Coax IPDS)

Early Print Complete is accessed under the Coax Interface menu selection. This configuration value applies only to IPDS on Coax. Early Print Complete is used to determine when the next print job can be sent to the printer. Do no enable or disable Early Print Complete while a print job is in process. If you do, you will need to restart the printer.

- **Disable**. The default. The printer waits for all print data in the chain to print before issuing a print complete status. The next print job is not started until printing of the previous job is completed. This can cause the printer to print at less than rated speed but can help ensure that all data is printed.

- **Enable**. The printer does not wait for all print data in a chain to print before issuing a print complete status. The next job can be started before printing of the previous job is completed. This can cause the printer to print at rated speed, especially when many short are sent to the printer at the same time.

NOTE: Some data, particularly the last few lines of the last print job, may be lost when this setting is enabled with host software other than PSF or InfoPrint Manager.

Undefined Character Substitution (Coax IPDS)

Undefined Character Substitution is accessed under the Coax Interface menu selection. This configuration value applies only to IPDS on Coax. Undefined Character Substitution specifies the replacement character to print in place of any unprintable character that is received by the host.

The character code point can range from hex 40 to hex FE. The factory default is set to hex 60.

Override Host

Override Host determines if the operator panel overrides specified IPDS menu values.

Select one of the following two values:

- **Disable**. The default. Does not allow operator panel settings to override IPDS application commands.
- **Enable**. Allows operator panel settings to override IPDS application commands.

The specified IPDS application commands for the IPDS menu values are:

- Graphics Quality
- Bar Code Quality
- Image Quality

NOTE: No other IPDS menu values or printer operator panels are affected by Override Host. Only the three values listed above are affected.

Graphics Quality

Determines the quality for graphics printing. Override Host must be enabled to use these settings. Here are the supported resolutions in pels:

- **High**. Vertical is 144; horizontal is 180.
- **Medium**. The default. Vertical is 144; horizontal is 120.
- **Low**. Vertical is 72; horizontal is 60.

NOTE: The higher the resolution selected, the slower the print speed. When selecting a resolution, try to balance the resolution quality your application requires with how fast you want the print job to print.

Bar Code Quality

Determines the quality for graphics printing. Override Host must be enabled to use these settings. Below are the values for non–rotated bar codes.

- **High**. The default. Vertical is 144; horizontal is 120.
- **Low**. Vertical is 72; horizontal is 60.

NOTE: The higher the resolution you select, the slower the print speed. When selecting a resolution, try to balance the resolution quality your application requires with how fast you want the print job to print.

Image Quality

Determines the quality for image printing. Override Host must be enabled to use Image Quality. If Override Host is disabled, then the image is assumed to be 144 by 144 and the image is printed at 120 by 144.

- **High**. Accepts images with 120 by 144 and prints images 120 by 144. With this setting, the image is printed as is and requires no conversion. Because no conversion is required, there is more fidelity between the original image and the printed image.
- **Low**. The default. Accepts images with 144 by 144 and prints images at 120 by 144. With this setting, the image is converted from 144 by 144 to 120 by 144. Since there is some conversion required, there may be some differences between the original image and the printed image. Review the note below for more information.

NOTE: There is one bit of image data per pel. If your print job contains an image created to print 144 by 144, which is very common for IBM 4234 printers, some bits of data will be dropped out to support the best fit resolution, which is 120 by 144.

When printing jobs with images created for an IBM 4234 printer, you will want to print a few samples to ensure the results are satisfactory.

IPDS Emulation Mode

Select which type of printer you want IPDS to support. You can choose either to emulate a 4234 or you can choose 6408/6412. You should choose which mode you use based on your software applications. For instance, if you are using PSF/MVS, then you would choose 6408/6412 as PSF/MVS provides support for this printer.

- **4234**. The default. IPDS supports 4234 printer functions. This is the default which should be used most often. If you are using IPDS with PSF applications, except PSF/MVS, make sure you select 4234.

  Please review Chapter 3, "IPDS Commands Reference" in your *6400 IPDS Programmer's Reference Manual* for information on using IPDS commands when you select 4234 from the IPDS Emulation Mode menu.

- **6408/6412**. IPDS supports 6408/6412 printer functions. Use this value when you are using IPDS with PSF/MVS. This value enables IPDS and PSF/MVS to take advantage of 6408/6412 printer functions which are supported directly by PSF/MVS. Other PSF applications only support this printer as a 4234 printer.

  Please review Chapter 4, "IPDS Command Differences" in your *6400 IPDS Programmer's Reference Manual* for information on using IPDS commands when you select 6408/6412 from the IPDS Emulation Mode menu.

NOTE: If you want to use the value 6408/6412 as the default value, you will need to select 6408/6412 as the default, save the value as a custom set, and then power the printer off and back on again.

Postnet Barcode Width

Determines the width of Postnet bar code. This option applies to non–rotated Postnet bar codes.

- **Standard**. The default. Postnet bar codes are printed at the standard width.

- **Narrow**. Postnet bar codes are printed with a narrow width.

NOTE: The printer caches bar codes to improve performance. Therefore, to change this configuration value, you will need to select the desired setting, save the value in a custom set, then power the printer off and then prewar the printer back on.

UPC/EAN Barcode HRI

Determines whether bar code HRI (human readable information) prints with UPC and EAN bar codes.

- **On**. The default. The printer always prints HRI with UPC and EAN bar codes, regardless of the HRI flag contained in the IPDS bar code application command.
- **Data Stream Setting**. The printer uses the HRI flag in the IPDS bar code application command to determine whether or not to print HRI with UPC and EAN bar codes. See the *6400 IPDS Programmer's Reference Manual* for more information about IPDS bar code application commands.

Enhanced Bar Code Mode

The Enhanced Bar Code Mode option interweaves the dots in IPDS bar codes so that more bar codes can be printed before the printer ribbon must be replaced.

- **Disable**. The default. Bar codes are printed in one of the standard qualities, as determined by the Bar Code Quality option and IPDS application commands.
- **Enable**. Bar codes are printed in the enhanced mode.

Only certain bar code types, sizes, an orientations are supported in Enhanced Bar Code Mode.

- Only bar codes with a unit module width of 0.017 inches are supported in Enhanced Bar Code Mode.

- For non–rotated bar codes, all bar code types except Postnet and Royal Mail are supported in Enhanced Bar Code Mode. Enhanced bar codes printed in these orientations will print at approximately the same speed as standard high quality bar codes.

- For rotated bar codes, all bar code types except Postnet, Royal Mail, UPC, EAN, and Code 128 are supported in Enhanced Bar Code Mode. Enhanced bar codes printed in these orientations will print slower than standard high quality bar codes.

NOTE: Bar codes that are printed in Enhanced Bar Code Mode that are not supported in this mode will print in standard high quality.

Compressed Font

The Compressed Font option allows the printer to print vertically compressed (short) fonts available on the IBM 4234 IPDS printer.

- **Disable**. The default. Normal size fonts are substituted whenever compressed fonts are requested.

- **Enable**. Compressed fonts are printed when requested by IPDS application commands. See the *6400 IPDS Programmer's Reference Manual* for more information about selecting these fonts with application commands.

Glossary

A

A to D Analog to Digital.

active column The horizontal location on the paper where the next character will print. After printing a character, the printer advances the active column.

active line The vertical location on the paper where the next character will print. After printing a line, the printer advances the active line.

active position The position on the paper where the next character will print. The active position is defined by the horizontal position (active column) and the vertical position (active line).

ACK (Positive) acknowledge. Affirmative or acknowledged.

ASCII American Standard Code for Information Interchange. A standard character encoding scheme introduced in 1963 and used widely on many computers and printers. It is a 8–bit code with 256 different bit patterns. There is no parity recommendation.

attributes, print Operations performed on text that alter its appearance but do not change the font. Examples: underlining, superscripting, bold, etc.

B

bar code A printed code consisting of parallel bars of varied width and spacing and designed to be read by a one-dimensional scanning device.

baud A unit of speed that measures the rate at which information is transferred. Baud rate is the reciprocal of the length in seconds of the shortest pulse used to carry data. For example, a system in which the shortest pulse is 1/1200 second operates at 1200 baud. On RS-232 serial lines, the baud rate equals the data flow rate in bits per second (bps). To communicate properly, a printer must be configured to operate at the same baud rate as its host computer.

bold	A print attribute specifying text of a heavy line thickness. **This sentence is bold.** *See also* **character weight**.
buffer	A reserved area in memory where data is written and read during data transfers.
bus	A circuit for the transfer of data or electrical signals between two devices.

C

character cell	The invisible rectangular space occupied by a character, including the white space around the character. The height of a cell remains constant even with changes in the current line spacing, and the width is equal to the current character spacing. Used as a unit of spacing.
character proportion	The ratio of character height to character width. *See also* **compressed** and **expanded**.
character set	A set of codes, each of which represents a printable character, including symbols, punctuation, numbers, diacritical markings, and alphabet characters. Each character is assigned a unique code value.
character weight	The degree of lightness and thickness of printed text. For example: **"Bold" refers to a heavy or thick character weight.** "Medium," "normal," or "book weight" refer to the character weight used in this sentence.
checksum	A stored or transmitted numerical value used to verify data integrity.
Code V	An optional QMS emulation which allows you to create and store forms: generate logos, bar codes, and expanded characters; create other graphics, and merge graphics with alphanumeric data as a document is printed.
command	An instruction, such as a form feed command, sent from a computer to the printer (sometimes called a control code or non–printable character). As opposed to data, which is information to be printed.

command delimiter	An ASCII character used to begin a command string (same as SFCC). Commonly used command delimiters are ESC (1B hex) and SOH (01 hex).
command sequence	Two or more bytes that instruct the printer to perform a special function. The first character in the sequence is a special function control character (SFCC), which alerts the printer that the string is a command sequence. *See also* **escape sequence**, **SSCC**, and **SFCC sequence**.
compatibility	The ability of one printer to accept and properly process commands meant for a different printer. (*See also* emulation and protocol.)
compressed	Refers to a typeface with a font width approximately 60% smaller than normal. Character height is not changed.
configuration	Refers to the operating properties that define how the printer responds to signals and commands received from the host computer at the printer interface. These properties are called configuration parameters and must be set to match the operating characteristics of the host computer system.
controller	An independent logic unit in a data processing system that controls data paths between the central processing unit and one or more units of peripheral equipment.
cpi	Characters per inch: a measurement of monospaced fonts indicating the horizontal character density. For example, 10 cpi means 10 characters can be printed in one horizontal inch.
cps	Characters per second: a measurement of the print speed of a serial (character) printer.
CPU	Central Processing Unit.
CR	Carriage Return.
CTØ	*Abbrev. for* Coax/Twinax only: a model available in a previous generation of the IBM Line Matrix Printer.
CTA	*Abbrev. for* Coax/Twinax/ASCII.

CTS	Clear To Send.
CVFU	*Abbrev. for* Centronics direct access Vertical Format Unit.

D

DAVFU	*Abbrev. for* Direct Access Vertical Format Unit. Also known as NVFU. *See also* **NVFU**.
DC	Data Controller.
DCD	Data Carrier Detect.
decipoint	One tenth of a point. A unit of length equal to 1/720 inch. *See also* **point**.
default	A value, parameter, attribute, or option that is used by a program or system if another is not specified by the user.
descender	The portion of a printed, lowercase character that appears below the base line. For example, "g," "j," "p," "q," and "y" all are characters with lowercase descenders.
diagnostic	Pertaining to the detection and isolation of a printer malfunction or mistake.
disable	To deactivate, make "false" (0), or set to OFF.
DP	*Abbrev. for* data processing print. This is a mid–quality, mid–speed print resolution
draft	A limited dot font used for rough copy. Low print quality but fast printing speed.
DRAM	Dynamic Random Access Memory.
DSR	Data Set Ready.
DTR	Data Terminal Ready.
DVFU	*Abbrev. for* Dataproducts direct access Vertical Format Unit.

E

EBCDIC	Extended Binary Coded Decimal Interchange Code.
EC	Engine Controller.
ECMA	European Computer Manufacturers Association.
EIA	Electronic Industries Association.
Elite	A name indicating a monospaced font with a pitch of 12 cpi (and usually 10 points in height).
em	A unit of measure in typesetting: the width of a piece of type about as wide as it is tall. (Derived from uppercase M, usually the widest character in a set.)
EM	End of Message (3287 only).
emulation	The ability of a printer to emulate, or function like, a different type of printer. (*See also* compatibility and protocol.)
en	A unit of measure in typesetting equal to half the width of an em.
enable	To activate, make "true" (1), or set to ON.
escape sequence	A command sequence in which the first byte is always the ASCII ESC character. *See also* **command sequence**, **SSCC**, and **SFCC sequence**.
ETX	End of Text.
EVFU	*Abbrev. for* Electronic Vertical Format Unit. Relates to the ability to slew (skip quickly a specified number of lines).
expanded	Refers to a typeface with a font width larger than normal. Character height is not changed.

F

family (or type)	A set of all variations and sizes of a type style.
FF	Form Feed.

FIFO	First In, First Out.
fixed–pitch fonts	Same as FONT, MONOSPACED.
FM Header	Format Header. Command strings used to switch between SCS and IPDS.
font	The complete set of a given size of type, including characters, symbols, figures, punctuation marks, ligatures, signs, and accents. To fully describe a font, you must specify seven characteristics: 1) typeface (Courier, Helvetica, Swiss, etc.) 2) spacing (proportional or monospaced) 3) type size (12 point, 14 point, etc.) 4) scale factor (character height/width ratio) 5) type style (Roman or italic) 6) character weight (bold, normal, etc.) 7) character proportion (normal, compressed, expanded).
font, monospaced	Also called fixed-pitch font and mono-font. Every character, regardless of horizontal size, occupies the same amount of font pattern space. All monospaced fonts use specific pitch size settings. Monospaced fonts are sometimes used when strict character alignment is desired (tables, charts, spreadsheets, etc.).
font name	*See* **typeface**.
font pattern	A font pattern is the matrix of pixels which represents a character, symbol, or image.
font, proportional	A font in which the width of a character cell varies with the width of the character. For example, [i] takes less space to print than [m]. Using proportional fonts generally increases the readability of printed documents, giving text a typeset appearance.
font weight	The thickness of the lines making up a character. For example, **"bold"** and "light" are different font weights.
font width	The measurement of the width of a character cell in dots.

H

hammer	The hammer spring with a hammer tip mounted onto it.
hammer spring	The flat piece of metal, made of spring steel, which supports and pushes the hammer tip.

hammer tip	The small, round point, located near the end of the hammer spring, which strikes the ribbon and leaves a dot on the paper.
hex codes	Based on a numeral system with a radix of 16.
host (computer)	The computer that stores, processes, and sends data to be printed, which communicates directly with the printer. The term "host" specifies the controlling computer, since modern printers are themselves microprocessor–controlled computer systems.
HS	*Abbrev. for* high speed font. Also referred to as *draft*.
HT	Horizontal Tab.
Hz	Hertz. Cycles per second, a measure of frequency.

I

IGP	Intelligent Graphics Processor. An optional emulation that converts graphics commands received from the host computer to binary plot data that is usable by the printer.
initialization	A series of processes and self-tests to set power-up default conditions and parameters.
interface	The hardware component used to link two devices by common physical interconnection, signal, and functional characteristics.
invoke	To put into effect or operation.
IPDS	Intelligent Printer Data Stream.
ipm	*Abbrev. for* inches per minute. A measurement of the speed of a printer printing in graphics print mode (plotting speed).
italic	A slanted type style. *This is an italic type style.* Both forward and backward slant are available.

L

LAC	Load Alternate Characters.
LF	Line Feed.
landscape	Printed perpendicular to the paper motion.

LCD	Liquid–crystal display. The LCD is located on the operator panel. Its purpose is to communicate information to the operator concerning the operating state of the printer.
LED	Light Emitting Diode. The printer operator panel has LEDs that indicate the state of the printer to the operator.
logical link	The parameters that specify data transfer, control, or communication operations.
lpi	*Abbrev. for* lines per inch. A measurement indicating the vertical spacing between successive lines of text. For example, 8 lpi means eight lines of text for every vertical inch.
lpm	*Abbrev. for* lines per minute. A measurement of the print speed of a line printer printing in text print mode.

M

monospaced	*See* **font, monospaced**.
MM	Millimeter.
MPL	Maximum Page Length. Also known as forms length. The number of lines that can be printed on a page.
MPP	Maximum Print Position. Also known as line length. (*See also* PMPP.)

N

NAK	Negative acknowledge. Not acknowledged.
N/A	Not available or not applicable.
NL	New Line (3287 only).
NLQ	*Abbrev. for* near letter quality font. This is the highest resolution mode supported on the 6400.
Not Ready mode	Offline. The printer is not ready to receive and process commands and data.

nS	Nanosecond.
NVFU	Direct Access Vertical Format Unit. *See also* **DAVFU**.
NVRAM	*Abbrev. for* non–volatile random access memory. This storage is permanent, in the sense that information is not lost when the printer is powered off.

O

OCR	*Abbrev. for* Optical Character Recognition. A process by which a machine can "read" characters printed in a special standardized font. Data are read by a photoelectric optical scanner and can be recorded on magnetic tape or disk. OCR-A and OCR-B are two widely used OCR fonts.
Ohm	A unit of measurement for electrical resistance.

P

PA	Program Attention. Used in applications programs.
parity (check)	Parity checking is the addition of non–data bits to data, resulting in the number of bits that are set to a "1" being either always even or always odd. Parity is used to detect data errors.
PC	Personal Computer.
PCBA	Printed Circuit Board Assembly.
pel	The smallest element of a physical medium that can be independently assigned color and intensity. Pels per inch is often used as a measurement of presentation granularity. Synonymous with picture element, pixel.
PI	*Abbrev. for* Paper Instruction: a physical hardware I/O line used in conjunction with the eight data bit lines. When PI is set high, it indicates that the eight data bits are interpreted as a paper motion command instead of printable data.
pica	A name indicating a monospaced font with a pitch of 10 cpi (and usually 12 points in height). Pica is also used in typography as a unit of measurement equal to 1/6 inch.

pitch	The number of text characters printed per horizontal inch. Specified in characters per inch or cpi.
pixel	Derived from picture (PIX) *EL*ement. The smallest displayable picture element on a video monitor or printable unit. In printing, a pixel is a dot.
PMPP	Physical Maximum Print Position. The longest line the printer is capable of printing. This differs from MPP in that the printer may be capable of printing lines 132 characters wide (PMPP), but the print job is only 80 characters wide (MPP). (*See also* MPP.)
point	A unit of length in printing and typography, used to specify type sizes, heights of font characters, etc. There are 72 points in a vertical inch; thus, one point equals 1/72 inch, or approximately 0.0139 inch. Some examples of point sizes are: This is 8 point type. This manual is printed in 11 point type. This is 14 point type.
POR	Power On Reset.
port	A channel used for receiving data from or transmitting data to one or more external devices.
portrait	Printed parallel to the paper motion.
print mode	Font.
proportion, character	*See* **character proportion**.
proportional	*See* **font, proportional**.
protocol	The rules and conventions that govern communication between a printer and a host computer. A protocol includes codes for printing text and graphics and codes instructing the printer to perform special operations. (*See also* compatibility and emulation.)

R

RAM	Random Access Memory. Can be read from or written to at any time. RAM is volatile: Whatever information is in RAM is lost when power is removed or interrupted.
RD	Receive Data.

read	To retrieve data from memory or from mass storage (hard disk, floppy diskette, etc.).
Ready mode	Online. The printer is ready to receive and process commands and data.
reset	To turn off, deactivate, disable, or return to a previously determined state.
resolution	A measure expressing the number of component units in a given range used to create an image; in printing, expressed as the number of dots per inch (dpi) horizontally and vertically.
ROM	Read Only Memory. Programs, instructions, and routines permanently stored in the printer that cannot be written to. Information in ROM is not lost when power is powered off. (ROM–resident fonts are fonts permanently stored in a printer and available at any time via software commands to the printer.)
Roman	An NLQ type style in which the characters are upright and the edges of the characters have a serif. This sentence is printed in a Roman type style.
RTS	Request To Send.

S

SA	Set Attribute.
SAA	Systems Application Architecture.
sans serif	An NLQ type style in which the characters are upright and blocked. This sentence is printed in a sans serif type style.
SCS	System Network Architecture (SNA) Character String. Usually commands to set printer format, etc.
serial communications	The sequential transmission of data, in which each element is transferred in succession.
set	To turn on, activate, invoke, or enable.

SFCC sequence	Special Function Control Character sequence. Two or more bytes that describe a specific printer control function. The first byte is always the SFCC. This also applies to IGP options.
shuttle	The subassembly in a line matrix printer that includes the hammer bank assembly, plus some or all of the drive mechanism.
size, type	*See* **point**.
SLD	Set Line Density.
slew	Rapid vertical paper movement.
SNA	Systems Network Architecture.
SOH	Start Of Header.
spacing	*See* **font, proportional** and **font, monospaced**.
SSCC	SuperSet Control Character. *See* **escape sequence** and **command sequence**.
start bits	In serial data transfer, a signal indicating the beginning of a character or data element.
stop bits	In serial data transfer, a signal indicating the end of a character or data element.
string	Two or more bytes of data or code treated as a unit.
style, type	*See* **type style**.
symbol set	*See* **character set**.

T

TCB	Task Control Block.
TD	Transmit Data.
TOF	Top Of Form.

TTL	Transistor-Transistor Logic.
type family	*See* **typeface**.
type size	*See* **point**.
type style	Refers to either the upright or italic character style in a specific font family. Roman is upright, *italic is slanted.*
typeface	A descriptive name or brand name that identifies a particular design of type. Examples are: Courier, Helvetica, and Swiss. Also called type family.
typographic font	*See* **font, proportional**.

U

UPC	Universal Product Code.
USET	*Abbrev. for* User–defined Set: An IGP command that creates custom character sets (except OCR fonts) from existing characters stored in memory.

V

VFU	*Abbrev. for* vertical format unit.

W

warm start	An almost complete reset of the printer: a) Data are cleared from all buffers. b) All internal system variables are reset to default (host set). c) Selected power–up configuration is loaded.
weight	*See* **character weight**.
write	To store data to memory (RAM) or to mass storage (hard disk, floppy diskette, etc.).

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